

EVAN J. MILLER

REDUCING WASTE AND CHANGING CULTURE

**A Collection of Five Breakthrough Case Studies
Showing the Impact of Real-Time Manufacturing Data**



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GainSeeker Suite Enables Dramatic Decrease in Cost of Goods Sold

Consolidated Container Company (CCC) is one of the largest suppliers of rigid plastic packaging in North America, with a national footprint consisting of 59 rigid plastic packaging manufacturing facilities and 2,300 employees. Many of their facilities were using outdated legacy information systems, and the company had no formal standardized quality data system. While some plants had modern solutions with accurate, actionable quality information, others were operating with archaic technology, and many were still operating off of paper-based workflows.

Lacking standard systems and a shared data platform, leaders couldn't easily see what was going on in the plants. According to Vicki Slavik, corporate quality director, the company was "an internally focused company, and quality was a pain point for our customers."

A new sense of urgency emerged when the company came under new ownership and a new senior leadership team in 2012. The new team came from industries where corporate-wide visibility into real-time Statistical Process Control data was commonplace. With these heightened expectations, the company's quality data systems had to evolve.

Choosing a Solution to Drive Quality Improvements

Matt Simpson, corporate quality systems manager, was tasked with recommending a single system to deploy across the company. The new system would provide plant-floor personnel with up-to-the-minute information about their asset's performance. At the same time, the data would be rolled up across production lines and manufacturing facilities so that leadership at the local and corporate levels could easily see what was happening.

Simpson developed a list of features and functionality needed by the company. He weighted the list by priority, and put ease of use for the operator as the most important priority. His logic: the operator is the critical starting point for collecting data. If it is too hard, too time consuming, or frustrating in any way, it would not get done.

"The heaviest weighting went to the operator," Simpson said. "That was first and foremost. If it's not easy for the operator, it doesn't matter how easy it is to analyze data because the data is not going to get put in."

Two other top priorities, according to Simpson, were data analysis and flexibility. "Next on the list was ease of use for analyzing data, followed by flexibility of the system. There were other criteria, but those are the highlights."

With that list in hand, Simpson surveyed plants across the company to determine what software was being used for statistical process control. From this survey, the quality team identified three potential solutions, including GainSeeker Suite.



Simpson asked the vendors to rate themselves, and then invited them to pilot their solutions in one plant using live data from CCC's production lines.

GainSeeker Suite Selected – Ease of Use a Key Factor

GainSeeker Suite became the clear front runner because it was easier for the operators to use, and it provided superior data analysis with increased flexibility.

Simpson said, "The other main vendors we looked at struggled significantly in ease of use for the operator. Their tools were very rigid. You collected data in the defined way their system said you were going to collect data."

For Simpson, the biggest difference with the other vendors was the inability to adapt to the operators' work processes. "You could change what data you were collecting, but it wasn't very flexible as far as what I would call workflow. What does it look like to the operator, and how does the flow line up? I really didn't have that much control of the look and feel. That was the biggest issue."

GainSeeker also provided superior data analysis. Simpson explained, "One of the packages we looked at was subpar for data analysis because plants that used it exported everything to Minitab for analysis."

GainSeeker's flexibility proved to be a significant bonus for Simpson and his team. "Customization and flexibility is a bonus," Simpson said. "I've been pretty demanding. I'll say 'I really want to do this, and I know it might not be easy,' the GainSeeker Suite has come through."

Working with Hertzler

Simpson has taken advantage of GainSeeker's customization capabilities to match individual and plant-level needs. This puts him in dialogue with the Hertzler service team to find creative ways to solve interesting challenges.

Although Simpson's goal is to standardize work as much as possible, he knows he can't force everyone across all of the facilities to work in exactly the same way.

In one recent situation, for example, Simpson and the Hertzler team designed three customized line capability dashboards:

- **Line Capability CORPORATE ONLY** - shows a table of all the plants sorted by capability and a graph of the plants and their capabilities.
- **Line Capability Extended CORPORATE ONLY** - shows everything that the above dashboard shows, plus a table of the line breakdown of each plant.
- **Line Capability PLANT USE** - shows a table of all the lines sorted by capability and a graph of all the lines in that plant.

These dashboards provide real-time visibility to the key performance indicators that people at the plant and corporate level need.

Simpson has appreciated the work of the Hertzler team. He said, "It's been great. There has been tremendous support. Most of everything we've tried to do has worked out and happened pretty quickly."



GainSeeker in Action

Although Simpson is only about a third of the way into their company-wide deployment, the company is beginning to see benefits. In one plant, just creating visibility into product weight has improved performance.

Simpson explained: "I had a plant that was running 6 grams heavy when we installed GainSeeker. In three months we dropped it to 0.13. They haven't started really driving improvement projects with software yet. That was just from having visibility to the data and realizing they were running that high."

For their business, that drop is meaningful because it is a significant reduction in cost of goods sold. As Simpson said, "That's resin. That's our most expensive part of the bottle."



Mueller Company Pivots to Data-Driven Culture

Sees Significant Yearly Scrap and Rework Savings

The Mueller Company was ready for a change. The multi-plant manufacturer of water distribution products had an excellent reputation in the marketplace, but the good reputation came at a price. Internal scrap and rework metrics told the story. High costs reduced the bottom line and took a human toll. With executive support and a broad-based team effort, the company's Chattanooga facility is serving as a transformational model of the focused, strategic shift to a data-driven culture.

Joseph (Buddy) Benford, director of corporate quality, described it this way, "We had the 'monthly one-off syndrome.' Every month we had a different reason why we didn't make our target."

Problem-solving teams shifted their focus constantly to address the current emergency. They lacked constancy of purpose over the long term. To make matters worse, data that could help them identify and solve problems was sadly lacking.

"It was chaotic," Benford explained. "Everybody was working like maniacs. They were all super busy ... It wasn't that our people weren't working hard or even that they didn't understand what they needed. The issue was they didn't have the data in front of them to know what to work on. Or if they made an improvement, how to quantify it."

While the plants were not in danger financially, there was plenty of money being left on the table from the high scrap and rework costs. Those high costs were a "hidden factory" that produced nothing but waste. If a company with 20 machines operates routinely with a 5 percent scrap rate, it is the equivalent of one machine in the factory dedicated to producing waste. This is called the hidden factory.

The Right Tool Begins to Uncover Hidden Factories

The Mueller team was frustrated. They took a step back from the intense fire-fighting and recognized the company was not living up to one of its core values: making problems obvious. Benford said, "Quite often we say we want to make problems obvious, but we're not quite sure what that means." The team realized they needed tools that made problems obvious. They needed to uncover the hidden factory.

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- Joseph Benford,
Director of Corporate Quality
Mueller Company

The company already had a lot of tools, including JDE as their Enterprise Resource Planning System, plus Excel, and Minitab, and a corporate-issue tracking system. What was missing was ready access to real-time, actionable data. One colleague had experience with Hertzler Systems' GainSeeker Suite at another company, and knew it was the missing link.



Prior to implementing GainSeeker, Mueller had been spending 60 to 70 hours a week (in one plant alone) in the administrative tasks of collecting, massaging and reporting quality data. Their manual systems undermined confidence in their ability to solve problems. Benford explained, "You would go to meetings and everyone brought their own data to the meeting. They were defending their data versus moving the organization forward."

Michael Broggi, manager of process engineering and quality assurance, added "There was no centralized data source that everyone trusted, so instead of coming together to solve problems, we would spend the entire time with our data."

Automating data collection had two immediate benefits. First, automation saved a significant amount of time. What used to take the plant up to 70 hours per week now takes about five hours a week. This time savings enabled the plant to redeploy staff from clerical work to solving problems.

But more importantly, the company's confidence in the data and what they could do with it increased significantly. With more time and more reliable data, they could solve problems faster, and monitor the impact of their solutions much more effectively.

Broggi explained that GainSeeker is "a primary tool for us to leverage, when we go to solve problems, where is the data that we need to solve that problem...?"

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- Michael Broggi,
Manager of Process Engineering and Quality Assurance
Mueller Company

Transformation Leads to Supply Chain Stability

Deploying GainSeeker provided a foundation for a culture shift that turned Mueller from a reactionary organization into a proactive company. This culture shift was supported by extensive training and coaching in problem solving methodologies, built on actionable data from GainSeeker Suite. (See sidebar story: ["Setting the Context for Culture Change"](#)).

This shift led to many benefits such as:

- 90 percent reduction in scrap and rework
- Effort hours to capture, manage, and analyze data reduced from 60 to 70 hours down to less than five
- Reduction in escaped pieces from 8 percent down to 0.5 percent

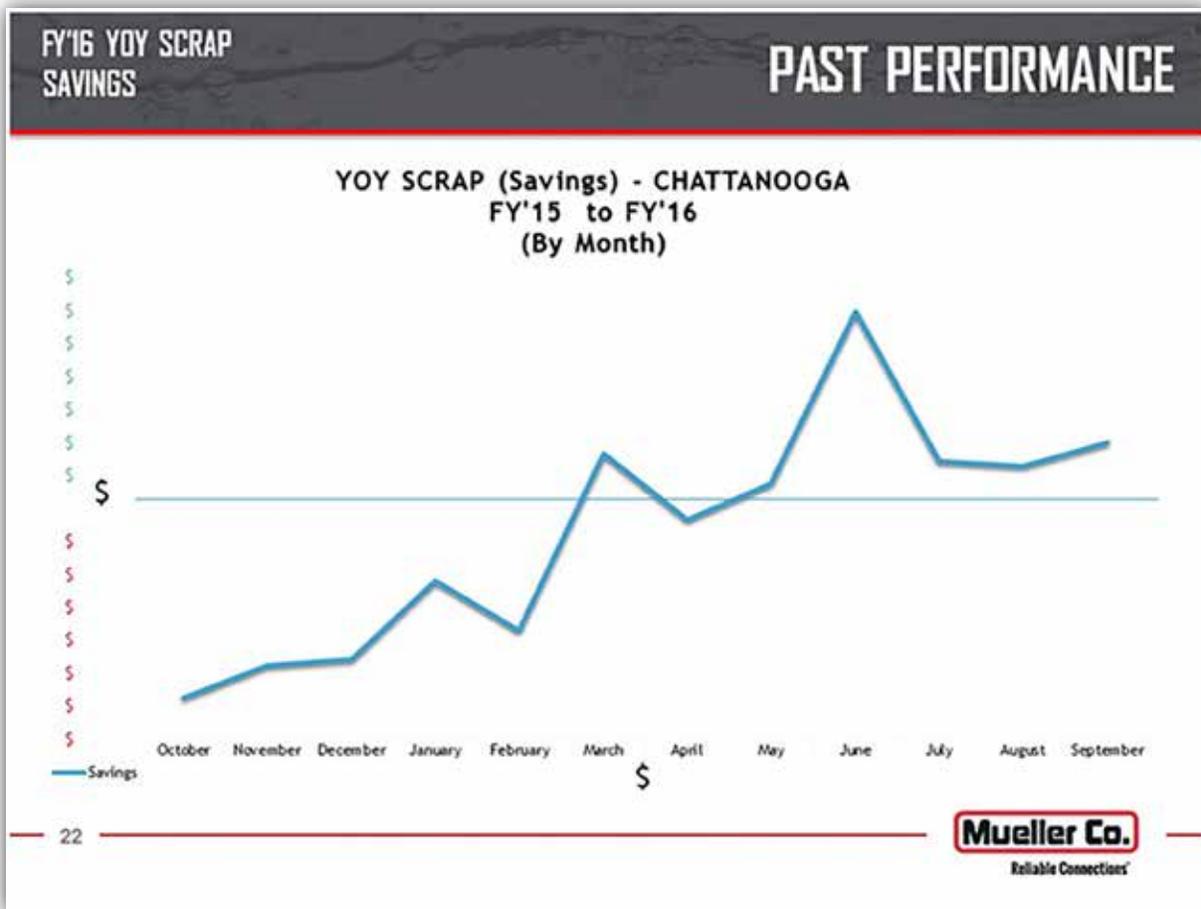
The Mueller Company has seen a major transformation in the way they are collecting and using data. They've shifted from being reactionary to being proactive. "We're trying to be anticipatory," Benford explains. "We want our team to be in a position that when their boss asks them for something, they've already got it."

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This transformation has already paid the company significant financial and personal benefits. The team expects GainSeeker will enable transformation well into the future.



Implementing GainSeeker Suite in combination with a comprehensive staff development effort resulted in significant savings in scrap and waste in the company.



Food Manufacturer Reduces Waste by Over 70 Percent in Six Weeks

Multi-plant pizza and mushroom manufacturer gains visibility into production processes and generates 70-80 percent reduction in waste and overfill in six weeks.

Current Way of Working Was Perceived as Good Enough

Dan Wadyka, assistant director of quality control at Giorgio Foods, was caught between a rock and a hard place. On the one hand, new company leadership was pushing for major growth and change. On the other, some managers and supervisors felt that the current way of working was good enough.



Wadyka saw an opportunity to support the growth initiatives of the leadership and galvanize support for these initiatives among middle management.

Production workers track product weights on the production line for frozen pizzas. These checks were recorded on paper, and the supervisor calculated average weight throughout the shift to maintain control of the product. At the end of each day, the data collection sheet was replaced and the completed form was collected for sign off and storage.

This manual process meant that line supervisors were only concerned with the current production run. If problems arose, managers spent hours and hours compiling hand-written data from pieces of paper before they could begin to make sense of what happened. Since the data was not in front of them, no one really knew the true impact on the business until it was too late to fix the issue.

Process reviews and approvals might be delayed for days. Management could not evaluate performance in a timely manner. Everyone had opinions about what should be improved to meet their growth goals, but no one had clear evidence.

Good Enough Is No Longer Acceptable

This situation was considered normal and “good enough” by supervisors. No one knew the impact or true cost of the legacy approach. Wadyka had an intuition that the impact was significant and that it was inhibiting the growth of the business.



In fact, the lack of timely information did not allow for impactful insights into production processes. While management attempted to analyze situations on the fly, more often than not a product that did not meet specifications would be discarded as waste, or overloaded with extra toppings. Blue waste containers proliferated, spilling over into aisles and walk ways.

The cost of goods sold from the waste and overpack were very high, but were considered normal and acceptable.

Culture Needs to be Transformed

No one had a clear understanding of how to solve the problem. Wadyka said, "We were not a waste-reduction culture. For example, a 12 ounce pizza would weigh about 14 ounce when it ships."

Wadyka had a mandate to drive change, but was extremely frustrated. To build momentum for change he knew he had to appeal to his colleague's heads and hearts, and to do that he needed data. He realized that since his team did not have an accurate, up-to-the minute and historical view of production, they had no way of knowing what was really going on in production and could not spot trends, reduce the variation on the line, or reduce the cost of goods.

Real-Time Information Empowers Change

Wadyka partnered with Hertzler Systems to implement real-time weight control on the production line. The implemented system puts tablets in operator's hands. The system guides the users to collect weight and compliance data. This information is collected on the pizza line at several points in the process so that the team can monitor and control each ingredient, and the final product weight.

In six weeks, Giorgio saw reduced waste across the entire line, providing significant savings. The low cost items, such as pizza dough and tomato sauce, saw a 70 percent reduction in waste and overfill. The high costs items, such as meats and cheeses, saw over an 80 percent reduction. "We could not be any happier with the results. GainSeeker has given us the visibility we need to reduce waste and product giveaway," said Wadyka.

Wadyka and his team no longer wait for days for weight data. Now they can interact with information instantly on a dashboard, and have a complete view of the process. Giorgio employees are empowered to act immediately to reduce overpack and waste.

“We were not a waste-reduction culture.”

- Dan Wadyka,
Assistant Director of Quality
Giorgio Foods

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Cultural Transformation Impacts Business Results

Giorgio Foods has driven significant performance improvements by empowering employees with real-time information that impacts business decisions. Managers and supervisors at all levels of the organization can take informed action faster than they ever have before. This shift contributes to a culture of empowerment that embraces change. Giorgio is now moving faster and more nimbly than ever before to capitalize on growth opportunities.

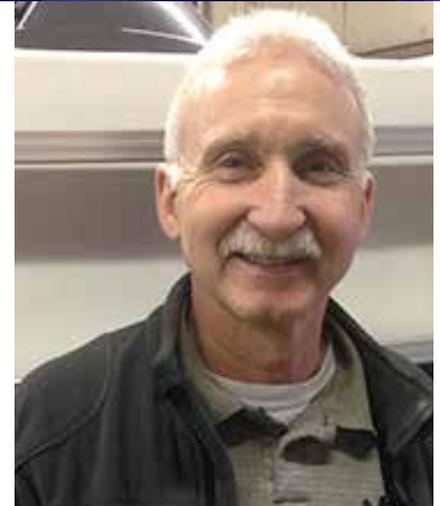


Eliminating Paper Enables Improved Business Performance and Cultural Transformation

A boat manufacturer transformed their approach to analyzing warranty situations by digitizing their plant floor.

Trying to Access Data Was Next Too Impossible

Like many manufacturers, boat maker Smoker Craft has enormous amounts of data. The challenge, according to Quality Assurance Manager Dave Frey, was that all the data was on paper. All these bits and pieces of paper filled dozens of filing cabinets. Many man hours were devoted to painstakingly digging through reams of hand-written sheets to find a relevant bit of data. Old information was archived in banker's boxes and stored off-site. It was next to impossible to access the data in a timely manner.



Dave Frey of Smoker Craft

Trying to analyze the data was also frustrating and time consuming. "When we used a paper system, it was hard to keep up," said Frey. This meant that at best the data was used for special situations – problems that were big enough to justify the effort to try and track down the data. When they had a problem, and they were fortunate enough to locate documents that contained pertinent information, trying to read the handwriting only added to the struggle.

For the most part, the company operated using old data, or handwritten notes on white boards. "When we came together for a meeting we were always working with old data. The problems weren't real anymore. Mostly we had opinions." This situation is ripe for cynicism, conflict and apathy.

“ When we came together for a meeting we were always working with old data. The problems weren't real anymore. Mostly we had opinions. ”

- Dave Frey, Quality Assurance Manager

Challenge to Eliminate Paper and Improve Data Analysis

Frey knew he needed to eliminate as much paper as possible, and improve how the data was analyzed and used.

The legacy paper system provided no controls or standards. Inspectors were free to base their evaluations on their own opinion of problem areas, not on common criteria. Data collection was complicated because inspectors needed to be able to climb all over the boats to perform the inspections.



Any time Frey wanted to use the inspection data, he spent many hours compiling, retyping and sorting data from paper forms. And because it was so difficult to see the big picture through these peeks into all the data, he often missed important signals and he'd end up taking his team down the wrong trail. They wasted time solving the wrong problem because they couldn't see the areas in highest need for improvement.

Intuitive and Precise Data Collection

Frey replaced their clip board and paper-based inspection process with iPads powered by Hertzler Systems GainSeeker Suite. The new system was custom configured to imitate the best part of the paper-based system. Users can still climb over the boats as they conduct their inspections, but now they tap iPad screens to log defect information.

Just as important, the system guides them through the inspection process. This guidance means that inspectors now follow standard processes and operational definitions. They now inspect with the same eye for detail.

Not only is the data more reliable, the guidance the system provides makes it much easier to train new inspectors.

Rapid Analysis and Improved Confidence

The best parts of this system according to Frey are "the easy accessibility to the data and the amount of paper we have eliminated. We had a lot of paperwork to file and it was hard to access. Now we just scan the bar code and all of that information is available electronically." Gone are the days of digging through huge amounts of paper or having to go off site to look through a bunch of boxes. He can now simply use GainSeeker.

The inspection process has become a lot faster, and the data is now in a form that makes analyzing the data very simple. Frey can use GainSeeker's powerful drill down feature on Pareto charts to quickly and easily identify the main areas requiring rework ensuring they are focused on the correct areas. Every week Frey meets with his inspectors to review the data in GainSeeker. Now he is confident he knows exactly what is going on when he engages in monthly management meetings.

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- Dave Frey, Quality Assurance Manager

New Insights Drive Significant Business Impact

By collecting the data using iPads, the inspectors have the ability to take pictures and record audio data. This additional information has been extremely helpful during audits or dealing with warranty issues. More detailed information about the condition of the unit when it leaves the factory has empowered Frey's team to understand the issues that arise during shipping and delivery. This makes it possible to focus resources where they'll have the most impact on customer satisfaction.



Better Data Leads to Cultural Change: Increased Accountability and Ownership

While Frey says the company experiences better warranty resolution, he feels that the cultural impact of eliminating paper has been significant. "Before using GainSeeker, everyone just thought it was part of life to not have easy access to data. Now they assume the data is there and it is accessible. There has been a real culture change. People feel like they can do something about it. They own it. It increases accountability and ownership."

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PLZ Aerospace Improves Production Control, Increases Sales

Improvement in control leads to sales growth, more consistent products, and line speeds increasing by up to 20 percent.

Legacy Systems Hamper Growth

PLZ Aerospace is North America's largest custom aerosol manufacturer and packager. They produce their own private brand products and custom formulations, and provide contract filling for other customers. PLZ has been in business for over 100 years and in the last six years underwent significant growth. Recently they realized that their legacy paper-based data management systems also need to change to effectively manage that growth.

PLZ had grown through acquisition and expansion of privately owned brands. As they combined smaller operating entities, each with their own legacy processes and systems, they needed to consolidate these legacy information systems and improve operating efficiencies. They began by implementing a common ERP system, improving their ability to schedule and track orders across all the plants in the enterprise. While that new system showed promise, there was even more riding on the company's reputation for quality. Thus quality data systems quickly became a focus for improvement opportunities.

As the new corporate quality engineer, Douglas Niemeyer realized that while the legacy quality systems had helped individual companies maintain control, there was a great opportunity for improvement by creating a more efficient corporate-wide system. Niemeyer had spent the formative years of his career in the electronics industry, where access to clean, timely data was taken for granted. At PLZ, inspectors on the shop floor were writing down quality numbers on paper, just as the individual companies had always done before. Quality team members periodically audited the floor, reviewing the data collected on paper and double-checking the line controls. "We would have inspectors on the lines, recording data in spreadsheets. Then the QCs were reviewing that data with a greater focus on keeping the controls 'in spec' versus understanding what the line capabilities really were, and when corrections should be made before a control ranged 'out of spec'."

It was Very Challenging

While it wasn't difficult to see if any of the numbers were out of specification, it was more difficult to understand how the product was running against target. And it was very difficult to compare how different machines or tooling were performing. Niemeyer said, "With the increasing number of products that we were trying to manage with the current level of personnel, it was very challenging to make sure everything was just being held in control."

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- Douglas Niemeyer, Corporate Quality Engineer



Another big problem was that the information was stuck on the factory floor. Problems were hidden and out of sight, and Niemeyer's team had little time for proactively improving operations. Quality staff spent a considerable amount of time managing rework when processes ranged out of specification. With increased demand for transparency across all the company's facilities, the practice of shoe-leather-based research proved to be inadequate.

Something Had to Give

On top of these inefficiencies, the PLZ quality team faced a challenge to bring staff costs in line with new corporate expectations. "We were challenged to reduce our head count while at the same time improve our quality and productivity," Niemeyer said. "There is no way we could achieve those conflicting demands while continuing to use our legacy systems and practices."

Rising staffing costs, customer complaints, poor efficiencies, and high inventory carrying costs impacted profitability. Quality staff spent many hours chasing last week's problems. Meanwhile, business performance suffered as the company was unable to leverage economies of scale through standardization across the diverse, legacy manufacturing plants.

Caught between high corporate expectations, the current reality of operating performance, and inefficient supporting data systems, something had to give.

Timely, Accurate Data Was Key to Improving Performance

PLZ decided to replace their manual, paper-based quality tracking processes with a single, state-of-the-art computerized system. With immediate access to timely, accurate quality data, they believed they could address a number of performance issues.

One of the legacy plants had successfully used Hertzler Systems's GainSeeker Suite for several years, but the corporate search team wanted due diligence to select the best solution. After a thorough competitive search, the team selected GainSeeker because they were confident it had the flexibility to handle the volume and diversity of products the company manufactured.

Company Sees Immediate Payback from Automated Paperless System

Starting implementation on two lines at their Pacific and St. Clair, Missouri facilities, the company began to see immediate payback from their efforts.

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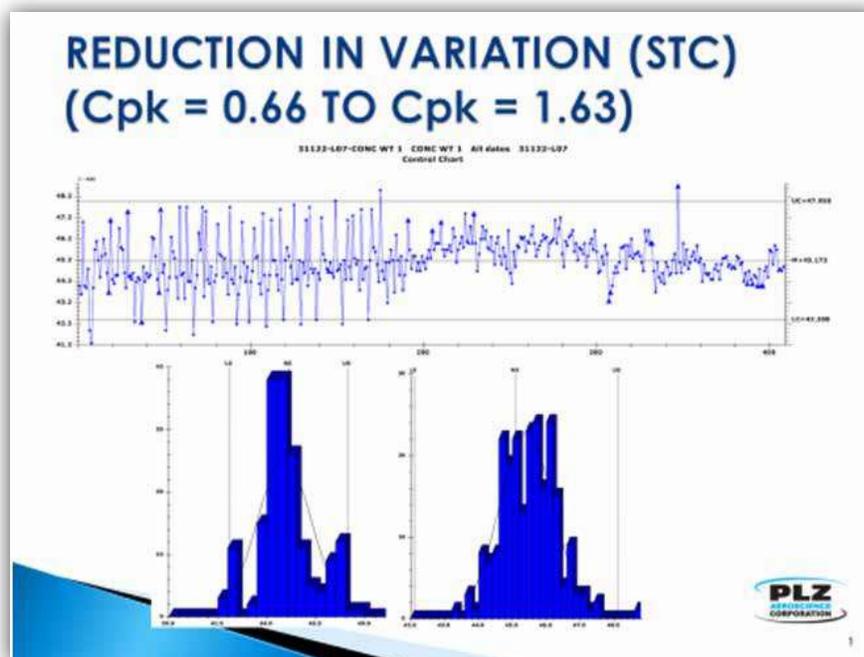
Hertzler worked with the PLZ team to implement a custom-configured deployment of the GainSeeker Suite to match PLZ's specific processes. Together they set up a system to collect data on the production lines and in the quality lab. Several dozen measurements were automatically collected from digital gaging equipment, or posted manually using a computer keyboard. These included a variety of pre-fill and post-fill weights, pressures, container dimensions, and other measurements. In addition, operators also were given limited ability to enter key performance attributes for spray patterns, visual appearance, and so forth.

“If I tried to analyze some of the things I do now with the system, it would take a hundred man hours just to be able to generate the data that I can now create in just a few minutes.”

- Douglas Niemeyer, Corporate Quality Engineer

Given the company's high-volume and high-mix business profile, Hertzler gave special attention to designing a sustainable system for managing the thousands of base products and hundreds of thousands of SKUs. All products are maintained in a company-designed (and very familiar) spreadsheet.

Data is now logged automatically into a single database from wherever the test is performed, either on the production floor or in a quality lab. As soon as they enter data, operators see their data plotted on a chart. These are typically plotted separately by key variables such as filler head. This makes it very easy to see how close individual filler heads are running to target, and to see (and react to) trends before they become problems.



Using GainSeeker Real-Time Analytics, PLZ was able to significantly reduce variation and increase the consistency of their products.



Real-time Data Empowers Significant Performance Improvements

With real-time data visible and available for making better business decisions, PLZ has been able to drive significant improvements in company performance. These improvements include:

- Reduced material costs
- Reduced head count
- Fewer product holds
- Higher production numbers
- Reduced inventory and raw material costs
- Higher product consistency
- Reduced customer complaints
- Increased revenue

With more timely and accurate data, the company has been able to reduce the variation in key fill weights, resulting in both reduced material costs and a more consistent product.

Niemeyer said, “When you have it charted, it makes it very clear what heads are functioning very well versus others that have a little bit more fluctuation happening than what we are comfortable with. That helps draw attention from the line mechanics to taking a look at the specific heads in need of attention so we can correct the problem sooner.”

More consistent products, along with more timely information about problems, has reduced the amount of product placed on hold. Reducing product on hold means that orders are filled faster, and this in turn helps cash flow. On top of that, better control of the fill process means that the company can hit their production targets more consistently, thereby reducing their dependency on warehouse inventory to meet customer order demands. This translates into reduced inventory and lower raw material costs.

Having better data and better consistency in the core business operation has allowed the company to speed up production lines. In the last three years, they’ve increased line speed by up to 20 percent.

The company has also been able to delay some investments in capital equipment upgrades due to better efficiencies from their legacy equipment. Lacking highly granular actionable data, many in the company had believed the equipment was doing the best it could, and would need to be replaced in order to improve speeds and fill rates. With GainSeeker Suite, the company has been able to pinpoint precise opportunities for adjustments or maintenance, and maximize the performance of their legacy

“ When you have it charted, it makes it very clear what heads are functioning very well versus others that have a little bit more fluctuation happening than what we are comfortable with. That helps draw attention from the line mechanics to taking a look at the specific heads in need of attention so we can correct the problem sooner. ”

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“ Having better data and better consistency in the core business operation has allowed the company to speed up production lines. In the last three years, they’ve increased line speed by up to 20 percent. ”



equipment. While the company may still decide to upgrade or replace this legacy equipment to push even higher performance, it will do so knowing that it has maximized the value of their original investment.

Another key benefit the company has realized is increased flexibility of their manufacturing supply chain. With plants geographically distributed, they can now assign specific production runs to the optimum location taking into account the overall production costs including internal transportation costs, quality loss costs, and so forth. This increased flexibility helps them be more responsive to their customers, and has, in turn, resulted in winning new and expanded business.

What about the original directive to reduce head count? With automated systems that focus on controlling the process, the company was able to reduce their quality department by half, and reassign staff to more productive activity. While that has been a significant savings by itself, it is arguably one of the least important benefits to having actionable real-time data available for better business decisions.

Improved Performance Drives Revenue Increase

“We’ve shown the system to our higher end customers and suppliers,” Niemeyer commented, “and they’ve been blown away. We’re leading the way and engaging with more high-end customers.”

For Niemeyer, the time savings has been enormous, especially given the increased scope of data now being collected. Today, PLZ is managing 100,000 data points a month from 11 production lines at two Missouri plants, and plans to expand the system to all facilities in the growing corporation.

Niemeyer said, “If I tried to analyze some of the things I do now with the system, it would take a hundred man hours just to be able to generate the data that I can now create in just a few minutes.” He is especially satisfied - proud even - of the feedback he has received from customers of the ripple effect across the company, and of the enormous benefits PLZ Aeroscience continues to realize from these efforts.

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- Douglas Niemeyer, Corporate Quality Engineer



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