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State-of-the-art SPC System Drives Financial Results

by Teresa Jostes

Does implementing a state-of-the-art Statistical Process Control (SPC) system make financial sense?

A leading producer of high-quality food products has used SPC to monitor package weights for more than 25 years. With such a long track record, you might think that they wouldn't gain a financial benefit by improving their SPC system. In fact, in a facility with a long track record of manual and automated SPC, they have realized over $150,000 in annualized savings thanks to recent SPC system improvements. Not only that, other facilities that had no systems in place were able to 'leap frog' the 25 year development cycle and quickly catch up with the more mature facilities. This case study examines how deploying a new SPC system made these fantastic results possible.

Driving from the rear view mirror

In one facility, the company produces more than 435,000 pounds of finished product every day on 22 packaging lines. While the plant is a sparkling clean state of the art facility, the methods they used to control their processes haven't always been as sophisticated.

As recently as two years ago the SPC system used for weight control was a paper-based X-Bar and R chart. With clipboard and pencil in hand, quality technicians would measure the package weights of small samples periodically from each package line. They would then compute the average weight of the sample and the range and record the information, along with some process data, on a standard form. The information was then submitted to a quality analyst at the end of each shift. The next morning, the analyst reviewed the data for missing information or errors, corrected any mistakes, and then passed it along to a key-punch operator to be keyed into a computer-based SPC package. Two days after the process data was collected, X-Bar and R charts were printed out along with Process Capability information for review by quality engineers and production managers.

With only this rear view mirror perspective, managers and engineers were caught in a daily routine of trying to understand what happened at least two days before. And if process changes were not detected when they happened, product holds and costly sorting and repackaging would result.

Clean room challenges technology

The need for timely information pointed to the need for a technology improvement, but the clean room environment at the company's plants creates a unique challenge for technology solutions. Any hardware installed on the manufacturing floor has to tolerate hose-downs with a disinfecting solution. Traditional technology solutions – hardened computers or putting computers in sealed enclosures

– were prohibitively expensive and never made it to the shop floor. That changed with the advent of low cost wireless networks and portable handheld devices. The company's quality auditors were equipped with Personal Digital Assistants (PDA's) to access product and process documentation. The portability of the device allowed the auditors to access the latest version of controlled documents and to record their audit findings from the shop floor, then easily remove the device when it came time to hose down the line.

When the audit system was up and running for a few months, more possibilities for use of the technology became apparent. If process audits could be done using PDA's, why not use the same technology for package weight SPC?

Identifying design considerations

The corporation tasked a Senior Business Analyst and Project Manager and the Corporate Manager of Continuous Quality Improvement with investigating the possibility of using the PDA's for SPC. Doing so would give the company's quality technicians and engineers more timely information, and at less than $400 each, the PDA's were an affordable hardware solution that had been proven effective in the food processing environment. The two business leaders began brainstorming the requirements of a PDA-based SPC solution. Several key requirements quickly rose to the top:

- A new system must be fully computerized. This would eliminate paper, remove delays in the process and significantly reduce errors caused by the redundant keying of process measures.
- A new system must provide an attractive and easy-to-use user interface so operators would fully embrace the new technology.
- A new system must be flexible enough to work well under a wide range of applications. With several dozen plants in several states, the company wanted to avoid many different software solutions implemented locally to solve the same problem. They had seen this happen before with software solutions and it resulted in expensive, redundant activities to deploy and support the disparate systems.
- A new system must be from a central server. A centrally managed system would simplify deployment, support, data back-up and software updates.
- Ideally the new system would integrate with the corporate ERP System so that package weight data could also be shared with the ERP system to calculate the "giveaway". Giveaway is the dollar-value of the product packed in excess of the stated net product weight, and it is a key business metric reviewed daily by management. Timely, accurate giveaway numbers without extra number-crunching by an engineer or manager also became a goal.

With this preliminary list of system requirements in hand, the two business leaders invited two Corporate Quality Engineers to join the team. These engineers are responsible for developing and deploying quality systems at all manufacturing plants. They agreed that hardware and software standardization were top priorities along with streamlining their reporting routine. If management summaries of package weight information could be automated, their time could be spent in more proactive activities.

Searching for solutions

The team began the search for a software solution that would meet their require-ments. They contacted suppliers and asked for demonstrations. A scale manu-facturer proposed new state-of-the-art scales and software that would work, but at $300,000 for one plant, the cost was prohibitive. Most of the SPC companies they talked to couldn't adapt their product to the hand-held's small screen. Others couldn't manage the interface with ERP and other databases.

Through this process, Hertzler Systems' GainSeeker Suite emerged as the one product that could meet all of the company's preliminary requirements. Gainseeker Suite enabled them to deploy SPC data collection on portable PDA devices, thus eliminating paper and reducing keypunch errors, and doing so in a very cost effective manner. The system proved easy-to-use for the process owners, and had the flexibility to work in a wide variety of applications. Moreover, the sys-tem could be deployed on a central server, and integrated well with the company's ERP system for giveaway reporting.

The project team made a pleasant discovery as they worked with Hertzler to explore these requirements: they found Gainseeker could do even more than they expected.

Learning new meanings of "real time data"

Real time data took on a new meaning when they learned they could customize alarms to out of control conditions. The operators would make package weight measurements, then enter the data in their PDA. Immediately, they would see an updated control chart with out of control conditions highlighted. The operator was then prompted for a root cause of the problem and provided a list of catego-ries and sub-categories from which to choose. Additionally, an email was sent to quality engineers and supervisors alerting them of the problem.
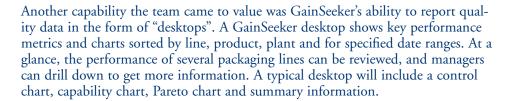
One of the quality engineers described one situation where ready access to real time, actionable data had a dramatic affect on her ability to meet production schedules and satisfy her customer.

With only a few days' production in the supply chain between the plant and the end consumer, a quality hold can disrupt shipping and production schedules, causing rescheduling and expediting of shipments. At times, the schedule juggling can impact upstream operations' schedules and material availability, creating a domino effect across many operations.

This corporate quality engineer was filling in for a plant quality manager when a scale on a packaging line went out of calibration. When the quality auditor did his hourly package weight checks, a below-weight, out-of-control condition was detected. When he entered the data into his PDA, the out of control point was flagged, and the system sent an email alert to the plant manager, superintendent and to the engineer's PDA. By the time the management team arrived at the line, the underweight packages had been segregated and tagged. With the noncon-forming product on hold and contained, management could focus on solving the problem and ensuring that the customer's delivery schedule would not be compro-mised.

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Another capability the team came to value was GainSeeker's ability to report quality data in the form of "desktops". A GainSeeker desktop shows key performance metrics and charts sorted by line, product, plant and for specified date ranges. At a glance, the performance of several packaging lines can be reviewed, and managers can drill down to get more information. A typical desktop will include a control chart, capability chart, Pareto chart and summary information.

The quality engineer called this reporting ability "phenomenal". Plant management reviews the giveaway caused by overweight packaging daily and uses the information to both short-and long-term corrective actions. Plant leadership now has the accurate, timely information they need to focus the organization on this critical business metric – instead of spending their time speculating about what happened several days in the past.

Deploying at the speed of now

The GainSeeker system is now is place at more than a dozen of the company's plants, providing both the quality and operations departments with critical process information in an easy to use format. The weekly and monthly reporting cycles for the corporate quality group have also been simplified. Where the quality engineer used to spend a day every month compiling quality reports on the performance of these plants, today summary reports are compiled and emailed to managers within 15 minutes.

The corporate quality engineer is also responsible for deploying quality tools across all the plants. Like many large corporations that have grown through acquisition, the company's local information systems can vary widely from plant to plant and understanding the infrastructure at a new acquisition can be a daunting task. This could complicate her job tremendously, but the Gainseeker system has been deployed on a Citrix Server in one central location. After an acquisition, the team can have even the most technology-challenged plants using Gainseeker within a week.

While each plant's management team may want slightly different information from the system, the behind-the-scenes database and the user interface is always the same. This simplifies user training and allows system administration tasks like data backup or the addition of a new processing line to be handled in one location by one administrator. It also ensures the consistency of format and integrity of the information provided by the software.

Leapfrogging the leaders

The ease of system implementation was proven at one new processing plant. This new facility had no prior experience with SPC – either on paper or using software. But the implementation "couldn't have gone more smoothly," according to the quality engineer. "It is so easy to set up the system for a new plant and its lines," she adds. "I went to the new plant and conducted training on SPC and use of the Gainseeker system. In less than a week, they were up and running! The operators really like the user interface on the PDA's. They find it very intuitive to use, so it's easy to deploy." Such an easy deployment has enabled the plant to leverage 25 years of learning from the other facilities and jump directly to the benefits of an automated weight control system. "This new plant is making very fast progress in reducing giveaway," the engineer explained. "They're not performing at the level of the legacy plants yet, but we're expecting and seeing very rapid improvements."

Envision the future

What's next for SPC at the corporation? The Senior Business Analyst is looking ahead. "We will continue our focus on weight control; we've proven that we can get great ROI there, and there are still a lot of opportunities. But we're also ready to move SPC upstream to the process inputs and into some transactional areas as well. We see additional opportunities to benefit from improved process control and the data Gainseeker can provide through implementation of the Hertzler Defect Management functionality."

Counting the dollars

Does implementing a state-of-the-art Statistical Process Control (SPC) system make financial sense? This corporation has found that SPC does, in fact, pay back. The fundamental discipline of process control not only makes sense, it saves money too. At just one plant in only nine months, the corporation realized a savings of $225,000. In the first half of the year, they saved approximately $3.4 Million across all implemented plants. The company projects that scale of savings to continue as they deploy GainSeeker Suite to other business units through the coming years.

About Hertzler Systems

Hertzler Systems has been a leader in Statistical Process Control, SPC Software and Six Sigma for over twenty-five years. We provide the leading real-time data acquisition and analytics SPC software, the GainSeeker Suite.

We serve a diverse customer base. Our clients include BAE Systems, Crown Audio, McCormick & Company, Inc., Hormel Foods Corporation, Snyders of Hanover, Titleist & Footjoy, IDEX Corporation, and TaylorMade-Adidas Golf Worldwide.

Our software and services enable clients to connect, collect, analyze, and visualize data; building a data infrastructure for making data-driven decisions.

These capabilities help clients improve throughput and yield, improve cycle times, reduce costs and errors, and increase profitability.

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Hertzler Systems Inc.®
Turning Data into Knowledge

2312 Eisenhower Dr. N.
Goshen, IN 46526
Phone: (574) 533-0571
Fax: (574) 533-3885
Email: info@hertzler.com

About the Author

Teresa Jostes is a Master Black Belt with more than 10 years experience in Six Sigma. She has a BS in Mechanical Engineering, an MBA and is an ASQ Certified Six Sigma Black Belt. Terri first became involved in Six Sigma during her 12-year career at General Electric. In May 2005, Terri launched Data Driven Decisions, a Six Sigma consulting firm. She is an adjunct professor at Capital University in Columbus, Ohio where she teaches their Six Sigma Black Belt program.