

## Creating a data-driven, fix-to-root-cause culture

Think back to the fall of 2008. It looked like the economy was in a free fall. Respected financial institutions like Washington Mutual, Lehman Brothers, and Wachovia were collapsing and being forced into shotgun weddings with competitors. Manufacturers like Spectrum, Smurfit Stone and others were either filing or about to file for Chapter 11 bankruptcy protection. Meanwhile the stock market was imploding, and businesses were shedding employees like trees shed autumn leaves.

In the midst of this, Crown Audio, a unit of Harman International, launched a major data systems initiative to improve data collection and analysis of repair and rework data across the organization. Why would a company invest in technology when most businesses were entrenching? All the indicators pointed one direction; Crown leadership chose another. Why?

By 2008, Crown had been on a Lean Six Sigma journey for over five years. Larry Coburn, then Vice President of Operations at Crown, gives a detailed debriefing of that effort on a video at <http://www.hertzler.com/php/portfolio/case.study.detail.php?article=40>

Within a few months of this presentation, Coburn would retire. Before he left he hand-picked his successor, Andy Stump, a seven-year veteran of Crown with related experience at similar manufacturing companies. Stump had begun working on this project before Coburn left, and provided valuable continuity through the transition.

Stump and his team looked at the project as a critical next step for Crown. “We had begun our lean transformation under Larry’s leadership,” Stump explained. “We had been talking about this specific project for nearly a year because we knew it would pay for itself very quickly and continue to pay long term dividends. We knew it was the right thing to do.”

The team believed the project would pay for itself in two ways. First, it would reduce the time required to capture data about in-plant and customer returns. Second, it would enable the team to make better use of failure data to improve throughput and first pass yield.

“Any time a technician repairs an amplifier or a circuit board that fails during production, we had them record that data in a quality data base,” Stump explained. “It turned out that we were collecting that data from eleven different processes and storing it in three or four different databases. None of these systems were linked, so we had multiple operators entering similar data for similar issues.”

“Furthermore,” he went on, “there were no defined processes to enforce the use of this failure data. The result was that we’d see the same problems surface again and again, rather than see the elimination of the issues.”

The purpose of this project was to establish a company-wide, user-friendly database that would further Crown’s evolution into a data-driven, fix-to-root-cause culture. The project helped refine and improve defect categorization, and defined processes that enforce the use of data to investigate, resolve to root cause, and monitor quality.

Crown first began working with Hertzler Systems in 2006 when Coburn had invited Hertzler to review their quality systems and identify gaps between their current system and an ideal system.

At the time, Coburn said “We were interested in Hertzler’s ability to evaluate our quality system and help us chart a course for improvement. With some intense work inside our factory they were able to deliver a very powerful executive report outlining what they observed and recommended action steps to get everyone on the same page and rally the entire team to go after quality improvement with a united front.”

Because of the success of those projects in 2007 and 2008 it was only natural that Stump and his team would again seek a collaborative effort with Hertzler Systems when it came time to overhaul the repair system.

Stump explained: “We have a really strong engineering team. They needed to set up the business infrastructure for making this project successful. Because they knew the Hertzler software so well, and because the Hertzler consultant knew our business, we had an outstanding example of team work and cooperation between the Crown team and Hertzler Systems.”

The result was a comprehensive data collection system that captured repair data from any one of eleven processes. The system gives technicians the ability to enter data using the computer keyboard or bar code reader. Users can also select data from lookup tables and lists from a variety of auxiliary data systems. Furthermore, where possible, the system automatically calculates (or derives) data based on values in other fields.

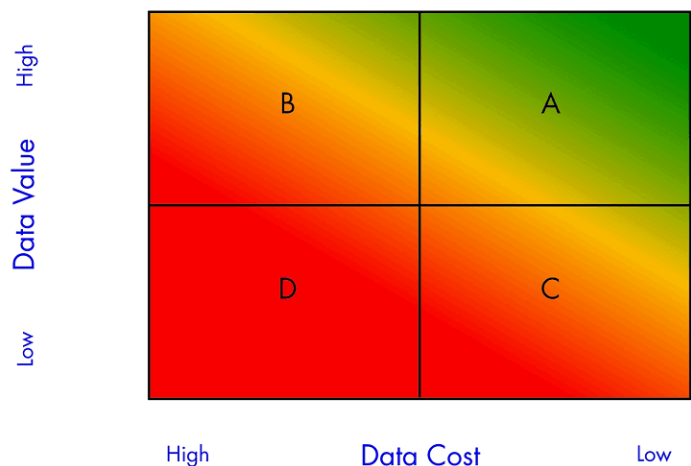
Once captured, the data is stored in GainSeeker Suite in a single, central data repository. Once there, the data is accessible to engineers from production, test, and design, as well as operations and quality staff. The system can track defect levels (DPMO) over time, and provides automated drill down Pareto analysis to enable users to get to the root cause of defects.

The results have been impressive. In a review seven months after the project was completed, Stump demonstrated (with CFO-approved numbers) that he paid for the initial investment in less than three months, and a total ROI after seven months of 171%.

According to Evan Miller, President of Hertzler Systems, the ROI was not as surprising as the way it was achieved. “I had a pretty good idea that we could help Andy’s team automate and streamline repair data collection,” he explained. “I expected that the ROI would be based on the efficiencies gained by eliminating islands of data, removing duplicate data entry, and integrating disparate data systems. I expected that he paid for the project by eliminating staff through automation. Clearly we could help Crown move laterally on the Data Cost / Value Matrix from expensive data to low cost data.” The data, however, revealed a number of surprises.

“First,” Miller explained, “Crown didn’t eliminate any jobs because of this project. As Andy reduced rework he reassigned the rework staff to more productive activities. They shifted from non-value-added status (overhead) to value-added production staff.

### Data Cost / Value Matrix



“More importantly, I was surprised to learn that reducing the cost of the data contributed only about 2% to the ROI. It was such a puny number.”

It turned out that most of the return on investment came from improved throughput and reduced repair. Cheaper, more reliable, and more accessible data enabled Stump’s staff to drive defects out of the process.

“We break it down by yield increase savings and repair cost savings by month,” said Stump. “Obviously if the yield is better you don’t have to repair defect product. And then the scrap and inventory carrying cost savings per month follow. That’s all driven by the yield.”

Nearly 70% of the cost savings came from reducing the amount of repair work needed. By building product right the first time, Crown nearly eliminated a substantial ‘hidden factory’ that took a substantial amount of time and held up work in process.

Of course, building it right the first time increased yield. Yield increases account for nearly 20% of the savings. Increased yield also triggered the balance of the savings: reduced scrap and inventory carrying costs.

“In a recessionary economy, it is exciting to see a project pay for itself in just three months,” Miller said. “It is dramatic evidence of the power of the shift to a data-driven, fix-to-root-cause culture.”

Stump agreed, adding: “We can’t credit GainSeeker with all of these benefits. We still had to do the work. But we would never have been able to capture the changes we needed to make if we didn’t have GainSeeker. We’d never have been able to do any of this if we didn’t have the system. So truly it deserves the credit. GainSeeker is the tool that enabled our people to make the changes.”

### **About Hertzler Systems**

Hertzler Systems provides seamless, accurate data acquisition solutions that drive business transformation. They have been in this business for over 20 years, with a diverse customer base in service, transactional and manufacturing environments. Their software and services enable clients to [connect](#), [collect](#) and [analyze data](#); building a robust data infrastructure for making data-driven decisions. These capabilities help clients to reduce costs, cycle time and errors, and increase profitability. Hertzler’s clients include BAE Systems, Crown Audio, IDEX Corporation, McCormick & Company, Inc., Hormel Foods Corporation, and TaylorMade-Adidas Golf, just to name a few.

### **About Crown International**

[Crown International](#), a Harman International company, manufactures amplifiers and systems control products for professional audio markets worldwide. Crown is located in Elkhart, Indiana. For more information, visit Crown online at [www.crownaudio.com](http://www.crownaudio.com).

### **About Harman International**

Harman International Industries Incorporated ([www.harman.com](http://www.harman.com)), designs, manufactures and markets a wide range of audio and infotainment products for the automotive, consumer and professional markets. Harman International maintains a strong presence in the Americas, Europe and Asia, and employs around 9,500 people worldwide. The Harman International family of brands includes AKG®, Becker®, BSS®, Crown®, dbx®, DigiTech®, Harman Kardon®, Infinity®, JBL®, Lexicon®, Mark Levinson®, Revel®, QNX®, Soundcraft® and Studer®. Harman International’s stock is traded on the New York Stock Exchange under the symbol NYSE:HAR.