

Case Study: Dramatic Reductions in Defects, Cycle Time and Labor Costs

“It’s not the people – it’s the process!”

Over the past 30 years, I’ve provided my seminars and consulting services to a wide variety of clients. I have worked directly with many companies and as an instructor and senior consultant for the Quality Support Group, the China Institute for Innovation, Worcester Polytechnic Institute, QualPro and other providers. Not long ago, I presented my *Process Improvement Certificate Program* to Waters Corporation on behalf of Quality Support Group, a training and consulting firm based in Peabody, MA.

Since 1958, Waters Corporation has been in the business of making innovative analytical instruments that assist scientists in reaching their scientific goals, increase productivity, and earn laboratory-based organizations a higher return on their investments in research, development, and quality control. After almost 60 years in business, Waters is now one of largest companies in the analytical instruments industry, supporting scientists working in the world’s 100,000 laboratories. With a hard-earned reputation for applications expertise and post-sales support, Waters stands out among its peers and, year after year, is one of the best-performing companies in the industry.

Waters engaged Quality Support Group (QSG) to provide training in support of a critical element of its corporate quality policy: “Quality is the responsibility of every employee within the Waters organization. We demonstrate our commitment to quality by monitoring and maintaining the effectiveness of our quality systems through business process metrics and by fostering an environment of continuous improvement throughout all levels of the organization.”

The Certificate Program

Over a three-month period, I presented for QSG my comprehensive *Process Improvement Certificate Program* for three teams of employees. The certificate program, customized in consultation with the Waters management team, included four seminars on various statistical methods and required the completion of process improvement projects that were selected by the managers. I met with the leaders prior to the certificate program to assist them in selecting good and appropriate projects. Each team had a senior manager appointed as the project sponsor.

I taught my seminars on the process improvement techniques and concepts every 2-4 weeks, and in between the workshops the teams applied the tools to their assigned projects. At the beginning of each subsequent seminar in the schedule, the teams were required to present certain “deliverables.” For example, three weeks after the initial *Process Improvement Tools & Concepts* course, the teams presented their project contract (signed by their project sponsor), initial As-Is process map, defined key measures, and summaries of their initial data collection efforts on run charts, histograms, or other appropriate basic graphs.

I was also available to the teams and team leaders via phone and e-mail to support their efforts throughout the certificate program. Frequent contact helped me to not only gain a solid understanding of problems and issues they were encountering, but also provide appropriate advice to keep their projects on track.

The Project

A critical component of one of Waters' analytical instruments is a machined and coated stator. It is produced in a process that's made up of a series of machining, cleaning, polishing and coating operations. The senior management team decided to assign a project to increase the stator yields by reducing chronic defects that had frustrated managers and employees for some time.

After the first seminar, the team mapped the process and collected data on the major causes of rejects and yield losses. Their Pareto diagram indicated that the top causes were handling damage and cleaning and machining defects, with handling damage accounting for 70% of the total scrap.

Digging deeper into the causes of handling damage, one might expect to find inattentive operators, operator errors, or sloppy workmanship. The team refused to fall prey to such an assumption, however. Instead they closely examined, stage-by-stage, the manufacturing process to identify any inherent origins of handling damage. Among other sources, the team documented the following:

- Manual de-burring operation, using a speed lathe
- Stators impacted by steel-tipped air guns when cleaning
- Damage caused by buffing operations
- Packaging that came into contact with stator surface during transportation
- Ineffective and unnecessary cleaning steps required of the operators
- Uncovered trays
- Different types and sizes of trays used to transfer parts

The different trays were identified as a major opportunity for improvement. Between various machining operations, the parts had to be placed by hand in different-sized trays because different machines needed the different sizes. The team proceeded to standardize the trays from four different types to just one, thereby no longer requiring numerous transfers of the parts between different trays by the operators.

The team also found it could eliminate a legacy buffing operation what required a lot of handling, but which was found to add little value to the quality of the parts. Improvements were also introduced to the cleaning system with new and better ways to control temperature, clean the surfaces and eliminate sources of contamination that resulted in rejects further down the line.

Project Results

Upon completion of the training and project work over a three-month period, the stator yield team presented their accomplishments in a meeting of senior managers and other project teams. The data documented the following improvements, among others:

- Overall cycle time reduced by 4,800 hours annually
- Reduced WIP
- Eliminated a buffing operation that reduced process lead time by 400 hours

- 1 million fewer opportunities for operators to handle and/or damage parts (due in large part to the elimination of three out of the four different-sized trays; numerous manual transfers no longer required)
- Reduced transportation costs
- Projected labor savings alone = \$100,000 (due to reduction of overtime, rework, etc.)
- Burt Bliss, Waters Director of Operations Engineering and the team's sponsor, noted that just one small portion of the documented cost savings funded the entire *Process Improvement Certificate Program* (three teams, 19 employees, 3 months of courses and project work)

One of the managers who served on the team wrapped up the presentation by summarizing some of their "lessons learned." He said the most important thing they learned about handling damage is, "It's not the people – it's the process." He referred to the original As-Is process map and its numerous inherent manual operations that invited damage. The operators were doing the best they could do; they could do no better; they were constrained by the process.

The Waters commitment to structured problem-solving and continuous improvement was both demonstrated and supported when the management team engaged me and Quality Support Group for training and consulting services. I expect the Waters-QSG partnership to continue to yield impressive improvements in the future.

In closing, I was grateful for the opportunity to represent QSG on this process improvement initiative, and for the positive comments and feedback that were provided by people who participated in the training and projects. Andre Kopoyan, a Waters Quality System Engineer, wrote the following in a note to Angelo Scangas, President of QSG:

The training course with Jim Leonard has been transformative. I am amazed that I have made it through a BS, MBA, ASQ CQE, and 10 years of professional experience without receiving the perspective that Jim has presented.