

Real-Life Six Sigma

These synopses of actual Six Sigma projects provide useful examples.

For many people, it's easier to learn by reviewing examples than by reading generalized descriptions. So in this column, we'll look at several quick overviews of Six Sigma projects to provide you with an idea of what Six Sigma deployment looks like at the project level. Of course, these synopses skip over significant factors, such as the leadership and infrastructure necessary to make the projects succeed. It's not that these factors are unimportant; to the contrary, they're critical. For additional information on the critical success factors, you may wish to review my earlier columns at www.pyzdek.com/pdf.htm



and www.qualitydigest.com, or in my book *The Six Sigma Handbook* (McGraw-Hill, 2001).

■ *Accounts receivable*—The Six Sigma team was tasked with improving the accounts receivable department's collection process. The project sponsor was the CFO, and the top-level dashboard item that generated the project was improved cash flow. The team decided to use the average age of uncollected accounts on the last business day of the month as their metric. Using X-bar charts because the histogram showed a very non-normal pattern, the team determined that the process was in statistical control with a mean of 57 days. Team members created a flowchart of the as-is AR collection process and used it to guide an observational study.

The team noted and corrected several discrepancies, and several obviously stupid things were changed. For example, a team member from billing asked why the term "Net 30 Days" was used. An experiment was conducted where the term was changed to "Due on Receipt" for a random sample of invoices. The results showed that the average time to collect for the experimental group was 45 days, vs.

57 for the control group. The difference was highly significant, both financially and statistically.

Next, the team contacted randomly chosen customers who had paid late and asked why they had been late. Fully 70 percent of the reasons for late payment were factors under the company's control (e.g., invoice errors or the bill being sent to wrong address). The team constructed a Pareto diagram and set about correcting the biggest problem areas. Within six months, the average age of uncollected invoices dropped to 37 days. The resulting savings were substantial.

■ *Printed wiring board components*—The Six Sigma team received its project from the material review board. The MRB identified the project as a significant and chronic contributor to the problem of failures at final product test. The assembly was a complicated piece of hardware and final test failures caused shipping delays, resulting in penalties and loss of customer goodwill. The team's project focused in the PWB assembly area. There were three major subprojects: errors at manual insertion, errors at automated insertion and errors at semi-automated insertion. A few examples of the issues addressed include kitting errors, the layout of the manual insertion workstation, the positioning of axial lead parts on the automatic insertion machine's parts tape and the speed at which semi-automated insertion was performed. Problems were prioritized and addressed, leading to a dramatic reduction of test failures.

■ *Cycle time*—The team was chartered by a program manager to help the company introduce new programs more quickly. The company would often introduce a new design into manufacturing only to find that it couldn't be produced, which resulted in quality and schedule problems. The team's project—one of several—involved establishing the capability of complex numerically controlled machining equipment. This was important because the company manufactured a

tremendous variety of complex parts in very low volume. Standard SPC was difficult because production runs were both short in duration and small in quantity. The Six Sigma team wanted to develop the ability to determine in advance if a particular engineering design could be produced at all and, if so, which CNC machine should produce it. To solve their problem, team members designed a special test part that put each CNC machine through a complete series of tasks. The parts were then inspected and the results used to determine machine capability for each type of machine movement (e.g., drilling small holes, milling a surface or machining a groove). This data was used to evaluate proposed engineering designs for manufacturability, for make-by decisions and to select CNC machines to produce specific parts.

■ *Injection molded parts*—The Six Sigma team was chartered to evaluate a problem with field failures of molded plastic parts. Members began by replicating the problem with production parts. The problems were resolved within a few weeks when the team identified a new process as the cause of the core problem. The process mixed two different plastic components at the injection-molding machine, as opposed to the single hopper and pre-mixed material of the previous process. If not properly mixed, the carbon black component would stratify and the product would fracture at the stratification when exposed to low temperatures.

For several more examples, visit the expanded online version of this column at www.qualitydigest.com/currentmag/html/sixsigm.html.

About the author

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