

Process Improvement Using SEWSS in Manufacturing Steelcase Answer® Systems Furniture Leads to 100% Yield

BACKGROUND. Steelcase Inc. helps individuals and organizations around the world work more effectively by providing knowledge, products and services that enable customers and their consultants to create work environments that harmoniously integrate architecture, furniture and technology. Founded in Grand Rapids, Michigan, in 1912, the company has led the office furniture industry in sales every year since 1974. Its product portfolio includes interior architectural products, furniture systems, technology products, seating, lighting, storage and related products and services.

MISSION. Steelcase engineers and quality professionals are charged with designing and maintaining processes, with the objective of producing consistently conforming equipment that meets customer requirements, while at the same time minimizing the associated costs. Since 1999, Steelcase Inc. plants have been introducing new technology to their production facilities, with dramatic success stories, both in the short-term and the long-term, and to the benefit of both Steelcase Inc., from a business perspective, and their customers, from a product quality perspective. Steelcase currently implements Lean Manufacturing, also called the Steelcase Production System (SPS), where a flow-manufacturing environment means production is pulled by customer demand.

CHALLENGE. The Steelcase marketing department determined that the design and the look of the new Answer® furniture line were well received by their customer base; however, shutting one of the doors in the system produced a hollow sound that could be improved. To address the concern, Steelcase R&D developed a brace for the door, which would act as a sound deadener. During the pilot production run for this improved door, though, it was determined that there was a problem with warp, which needed to be addressed. They used a technique called Process Qualification, a standardized method developed by Steelcase, to evaluate their processes and products and to “qualify” their processes.

SOLUTION UTILIZING SEWSS. Several data analysis tools in SEWSS were used to isolate the specific problems in this process. First, SEWSS Data Collection and On-Line Monitoring and Alarm Notification tools were used to automatically e-mail the manufacturing engineer, each time that the product was identified as Out of Specification. The engineer then used the Statistical and Graphical Analysis Tools provided by SEWSS to identify the point in the process where the warping occurred and to isolate the causes of the problem. A Gage Repeatability and Reproducibility Study was conducted and provided confirmation that the measurement system being used was stable and reliable (the percent of variability attributed to R&R was less than 6%). Then, a 3 Factor Designed Experiment was used to systematically vary the key parameters involved in the process (weld pressure, support, and weld sequence), to determine with a probability-based confidence which were the critical factors influencing the warping in the final product. Support was identified as responsible for much of the problem.

RESULTS. Fantastic results were achieved by modifying the process, paying special attention to controlling the support in the Answer® System, so that the warping would be minimized. In the final analysis, the Cpk (demonstrated capability of the process) had been improved, remarkably, from .15 (clearly incapable process) to 1.5 (clearly capable process). The yield from this process went from 75% to 100% as a result of these analyses and subsequent process improvements. In fact, Steelcase is now considering reducing final product inspection by 50% due to the consistently superior performance of this process and the resultant quality improvement in the final product. Steelcase continues to implement SEWSS throughout its manufacturing facilities and train its engineering and quality professionals in statistical process control techniques, as well as higher-end statistical methodologies.

Cpk improved from .15 to 1.5.
Yield from process improved from 75% to 100%.
Consistent superior performance of process.



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