

### Improving and Controlling Key Processes with SEWSS: Real-time Monitoring and Alarm Notification

**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 Panel Plant identified a need to improve and control key processes in their basic division, which produces components for steel based panel systems. They used a technique called Process Qualification, a standardized method developed by Steelcase, to evaluate their processes and products and to "qualify" their processes. A PQ team was formed, supported by members from manufacturing, engineering, quality assurance, tooling, and machine maintenance. Several components make up the assembly of the finished product. To support the SPS principles and to avoid stack-up tolerance conditions in the final assembly, several key processes were identified for improvement.

**SOLUTION UTILIZING SEWSS.** The first process studied was a tube mill, which produces square shaped steel tubes. Key characteristics include length, width, height, bow, camber and squareness. The team started with an enumerative study of the process to identify the current state. The Process Analysis tools in SEWSS were used to quickly analyze large amounts of data for each characteristic. The information obtained from the analysis helped identify the characteristics that needed the most improvement. SEWSS Interactive Quality Control Charts were set-up for each of the key characteristics. The team worked with the tube mill operators to record inspection results over several runs. Using the Interactive Control Charts, the team was able to identify and reduce special causes of variation and unstable trends. SEWSS's Process Analysis tools were used a second time to analyze and report the data for a follow-up study. The follow-up study verified significant improvements in short term capability for each characteristic.

**RESULTS.** Short term capability improved by 80% for some characteristics. Goals for Cpk and other measures were also met. After the short-term study, SEWSS Interactive Control Charts were continued to monitor process control and verify on-going capability. The alarm function in SEWSS was initiated and now alerts key support personnel via e-mail if the process exceeds the control or specification limits. This alarm function enables the support team to quickly respond and assist the operators. 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.

Short term capability improves  
by 80%.

Alarm notification helps team  
respond quickly to out of  
control processes.



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