Minimize Variation through SPC for Production and Quality Improvement

A perfect manufacturing process may seem impossible to achieve but it's still a goal manufacturers can aim for. One way of striving towards this goal is through the use of a Statistical Process Control (SPC) system. Using an SPC system, users can find the factors holding their plants back and eliminate them. SPC is a functionality that allows users to acquire statistical data and analyze it using powerful statistical tools. With the help of an SPC system a plant can become closer to achieving this impossible goal of perfection.

Scrap, waste, and rework are some areas that influence the overall efficiency of a plant. If any one of those areas is lagging you can expect to see a dip in the overall plant performance. In order to fully understand why any one of those areas is subpar you must look at the underlying factors involved in the production process affecting them. An SPC system is designed to do just that, giving users the need visibility to fix issues before they are a problem.

There are two overall indicators that should be monitored during a production process. One is process data and the other is product data. Process data are the characteristics that are part of the actual production process. This data can be characteristics such as speed of a machine, temperature of an oven or cycle time of an injection mold. The other type of data that should be monitored by an SPC system is product data. Product data are characteristics that deal with the actual quality of the produced product; such characteristics can be color of a product, dimensions of the product or weight of the product. Together these two data types give quality managers the needed visibility into their process to optimize production runs. Such optimization is only possible by comparing process settings with the quality of the product it produces across multiple production runs.

Another key benefit of an SPC system is to stop a problem before it starts. Good SPC systems allow users to define control rules (custom or standard) and control limits; both of which help keep a process from producing bad parts. Control rules look for shifts or trends in characteristics plotted on charts, such as x-bar. The goal of monitoring these rules is to forewarn operators of potential problems. Violations of these rules act as pre-cursers to potential problems. Control limits are limits set on charts such as x-bar and are the "voice of the process". Control limits are calculated using process data and help monitor the process to make sure machines are running acceptable. A violation of a control limit means a process is out of control. In either case the system should be able to notify the correct personnel in order to adjust the process before too many bad parts are produced.

But SPC alone cannot assure the highest quality of finished product to your customer (that depends much on the quality of the input materials), but it can assure the consistency of the finished product by eliminating common causes of variation and watching for special causes of variation. Some customers might have stricter quality requirements than others; requesting documentation to prove your quality. An SPC system should deliver reporting tools such as

Histograms and Pareto charts in order to satisfy such requests. This can also be used to satisfy federal manufacturing regulations (e.g. Food and Drug Administration) to prove quality and reduce hazardous risk.

Due to the high demand for automation to cut long-term costs versus the high overhead costs just to install such automation, SPC data collection can be done in a wide variety of methods. A SPC system should offers manual input (e.g. reading from a handheld measuring device), semi-automatic input, and fully automatic input. Manual input includes an operator entering a value from a non-electronic measuring device or a count of visual defects on a semi-finished or finished good. Semi-automatic input takes advantage of some automation by collecting data directly from the manufacturing equipment yet still requires an operator to confirm the data. Fully automatic input requires no operator input and seamlessly collects data behind the scenes. Any process can use any mixture of data collection methods.

Having worked with customers from both discrete (auto parts) and continuous (food & beverage) industries Hyla Soft has a wide range of expertise and is ready to help your company find and implement an SPC solution.