CASE STUDY

The outer diameter of a pipe is measured by a Mitutoyo Digimatic Indicator connected to a Mitutoyo U-Wave Transmitter. The U-Wave sends measurement data to a PC where Mitutoyo's MeasurLink® collects and unifies data for analysis in a lab or real time.

MEASURLINK® TRANSFORMS QC FOR PINNACLE MACHINE WORKS

Mitutoyo America Corporation

Mitutoyo

MeasurLink® Transforms QC for Pinnacle Machine Works

CUSTOMER PROFILE

Located in Houston, Texas, Pinnacle Machine Works is a manufacturer of oilfield couplings ranging in size from 4.5" to 10.625", as well as a provider of threading services of full-length pipe in the same size ranges. Established in 2013, Pinnacle Machine Works has more than 100 employees and is housed within a state-of-the-art facility licensed by API to API 5CT and to API Q1 standards.

CHALLENGE

As Pinnacle grew, in late 2017 they embarked on a mission to transform and improve productivity. This involved a re-organization of the manufacturing plant, the rollout of lean initiatives and an investment in new tooling. As this transformation progressed, it unveiled additional opportunities for improvement. In particular, it became clear that quality still needed to improve and inspection only, as a means of improving the quality of their product, was not possible. The traditional inspection/QC (quality control) techniques of writing measurements down and not doing much with that valuable information were too slow and limited any potential manufacturing gains. Every product produced was already inspected dimensionally and visually, culminating in thousands of inspection points per day. More costly measuring equipment was not going to solve that. This prompted Pinnacle to investigate new QC options.

SOLUTION

In reviewing options related to improving and streamlining QC processes, Pinnacle realized they could either go the manual route and add additional QC personnel or go the digital route and invest in an electronic gaging solution. The company decided that switching to an electronic gage was the only logical choice—it would enable Pinnacle to maintain an accurate and increased product flow without increasing labor costs. In addition, it would allow for real-time data collection and the use of SPC (Statistical Process Control), which to this point had not been possible, to make serious improvements to the manufacturing process to improve quality.

When selecting the data management solution that best fit their needs, the company considered a number of criteria: the ability to utilize traditional gages/techniques that were called out by API 5B; the ability to capture inspection values in the software and store them by date, work order, machine center, or other category; and the ability to report on, and analyze, any and all inspection field data in order to uncover trends and determine better control measures. Mitutoyo's MeasurLink® Quality Management Software turned out to be the only product that fulfilled the company's criteria and aligned with their future goals.

"We knew MeasurLink® was the right choice for Pinnacle after looking at several other QC data collection options," says Jim Caldwell, General Manager of Pinnacle. "It was one of the few options that had the power to provide us with real-time data and analysis."

RESULTS

MeasurLink® has now been used on the coupling shop floor for over a year, with full implementation occurring within the last six months. As a result of installing MeasurLink®, Pinnacle has seen their reject rate drop from 3 percent to 1.3 percent. At the same time, overall shop productivity has increased by 45 percent. To date, their reduction in the instance of non-conforming product has saved the company more than $180K in lost material alone.

Now that the software is in place, Pinnacle is beginning to utilize control (Cpk Ppk) measures/targets to better control the process. Run charts and control charts allow machine operators to visualize their work. This is having a positive impact on employees, who have been extremely happy with the product post-implementation—especially how it improves accuracy while at the same time streamlines their workflows.

Employees are also able to easily ascertain information about when and why a part goes out of specification, which allows the quality manager to use a Pareto chart and other quality tools to identify the best place to take actionable improvements. One unexpected benefit of rolling out MeasurLink® has been the ability to re-use the data for production throughput and tracking. Given the positive response to, and added benefits of, this MeasurLink® adoption, Pinnacle is now in the process of implementing the product in their thread shop, as well.

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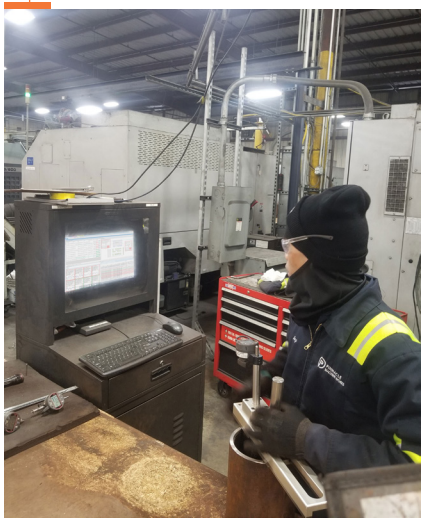


The internal diameter of a pipe is checked for being within spec using a Mitutoyo Indicator, and the data is displayed in real time on a monitor on the shop floor. Data displayed in real time allows for better, faster quality control on the manufacturing floor.

MeasurLink® Transforms QC for Pinnacle Machine Works

In terms of advice Pinnacle would give to other organizations looking to upgrade their QC process in the same way, the company stresses the importance of having a local subject matter expert. It's vital to have someone who can walk with you step by step through the decision and implementation process, especially since rolling out a new solution is essentially a full-time job until it's completely set up and functioning at the expected level.

Caldwell advises companies who are looking to streamline the QC process to look ahead to the finish line despite how cumbersome this type of implementation might be, as the end result has far exceeded his expectations. "It is incredible to see all the gains that Pinnacle has made in terms of control of product and efficiency of operations in just under and year, and what's more incredible is that we've realized a full return on capital investment in that same timeframe," he concludes.

About MeasurLink®

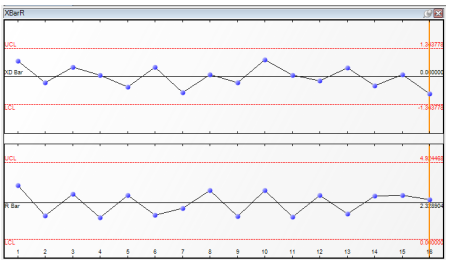
Combined with a multi- user relational database, MeasurLink® delivers a safe and organized data warehousing system that makes quality data available for viewing and analysis by any member of the production, engineering, and managerial staff throughout a company. Inspection in the factory produces data for analysis, corrective action, and various reporting needs. As the backbone of quality efforts, MeasurLink® reduces production costs, quality costs and increases your bottom line.

Production Impact

45%
increase in shop productivity

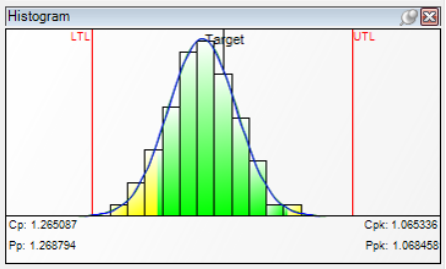
$180k
saved in lost material from non-conformance

Run charts and control charts allow machine operators to visualize their work.

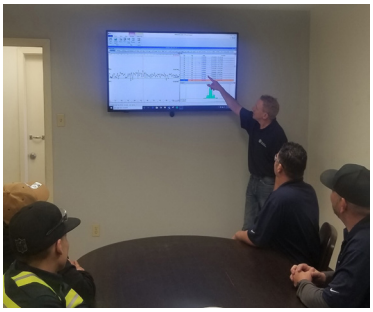


The XBarR chart is a popular control chart used for SPC at Pinnacle. It clearly displays if parts are the same size over time and if the manufacturing process is consistent over time. Trends and patterns are easily identified with this chart and corrections can be made as soon as it occurs.

Pinnacle is beginning to utilize control (Cpk Ppk) measures/targets to better control the process.



Pinnacle is beginning to use MeasurLink's Histogram chart, a commonly used SPC chart, which displays capability indices such as Cpk and Ppk to predict how many defects per million they should expect if they were not going to make any changes. Additionally the chart shows the distribution and location of their measurement data with respect to the tolerance. This can easily let operators and engineers know what process adjustments need to be made.



MeasurLink displays measurement data for Statistical Process Control (SPC) analyzing what-if scenarios with historical data, making Pinnacle's quality control process more efficient and accurate.

"we've realized a full return on capital investment"

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