

Tips From the Trenches: Getting the most out of Pareto Analysis

Born in 1848, Vilfredo Pareto gave us a powerful analytical tool that is still used today, though often under utilized. Basically, the Pareto principle asserts that we can often expect 80% of results coming from 20% of inputs – whether talking about population land ownership (original application) or cause-and-effect analysis.

Years ago, I first used Pareto Analysis as a means of sorting through audit findings as part of my quarterly internal quality audit report. However, Pareto diagrams can be used effectively to not only analyze attribute nonconformance data, but also, root cause (RCA) and corrective action (CAPA) data. Even when a root cause has been appropriately identified and effective corrective action determined, serious systemic or chronic concerns can remain. Analysis of RCA and CAPA data over longer periods of time, can lead to identification of trends previously overlooked. For instance, repetition of a root cause determination or required corrective action, even over time, and across different departments or functions, may be an indication of larger and/or related issues, spread throughout the organization. These larger issues, might not be seen through a traditional RCA and CAPA determination, because the focus, however broad, would still be too limited to recognize the issues found within a much larger framework.

Let's take a look at specific examples of how you might apply pareto analysis in your environment. Plotted against number of occurrences on the y-axis, typical noncompliance categories might be - performance standard, nonconforming material, calibration, reference standard, incorrect/inadequate equipment, document control, process control, environmental control and other, all plotted along the x-axis. Also plotted on the x-axis, typical root cause categories might be – inadequate training, inadequate procedure, operator noncompliance, equipment/software malfunction and other. Auditors could also use the 6Ms – man, machine, measurement, method, material and mother nature (environment), as points along the x-axis. Needless to say, professionals in the service industry would use an entirely different set of metrics. Bottom line is that it is up to the individual to select appropriate metrics, based on the environment that they are working in, and the information they are looking to attain. Even the “Other” column can provide significant information. My own rule of thumb is that if the number of occurrences in the “Other” column is greater than the 3rd highest on the graph, you may need greater discrimination (more categories) along the x-axis. If greater discrimination is not practical, and there are truly a significant number of other individual occurrences, then it would be wise to investigate further, to look for a systemic underlying cause.

The great thing about Pareto analysis is that it can be used for a detailed look at DOE and other activity results, or as a “big picture snap shot” for upper management quality system review. It is important to remember that how we look at our data can be just as important if not more so, than collecting the right data for review. So don't be afraid to think outside of the box when using this simple but powerful quality tool.

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