Practical Statistical Problem Solving Using Minitab to Explore the Problem

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Abstract

A problem must be understood before it can be properly addressed. A thorough understanding of the problem is critical when performing a root cause analysis (RCA) and an RCA is necessary if an organization wants to implement corrective actions that truly address the root cause of the problem. This poster talk will list various problem solving related statistical tests that can be performed using the Minitab Statistical Software Program for exploring a problem in the early stages of an investigation. The statistical tests in Minitab will be depicted in the form of a cause-and-effect diagram. The main branches will list the categories of ways in which the data can be explored; these man branches are tests of differences, analysis of time related factors, Exploratory Data Analysis (EDA), assessments of capability and process stability, and relations between factors.

Tests of differences will have sub-branches split along two main sub-branches; hypothesis test for normally distributed data such as t-tests and Z-tests and non-parametric tests such as Mood's Test of medians and the Kruskal-Wallis Test of two or more medians. The branch for time related factors will list methods such as the time series plot, tend analysis, and a test for autocorrelation. The relations branch lists regression analysis.

The capability and stability branch will be divided into two major sub-branches. The process capability and performance sub-branch will list studies such as Cpk and Ppk. The stability branch is based on Statistical Process Control and will list many of the SPC charts available in Minitab. The three main SPC sub-branches will be for continuous data, attribute data, time-weighted charts. The EDA branch will list box-plots and individual values plots; which can be used for getting an idea as to which type of test should be performed with the data.

Minitab outputs will be displayed on the poster to illustrate the results of a selection of the statistical methods described.