

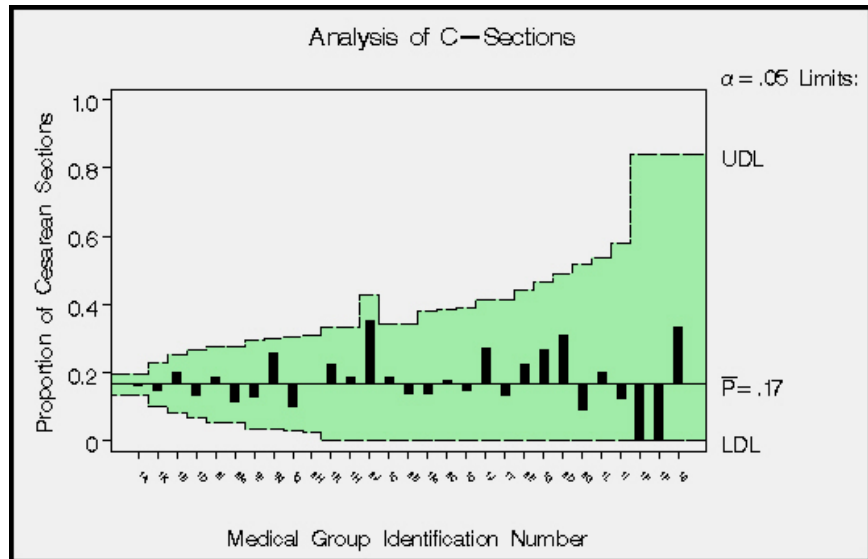
# Enhancements to SAS/QC Software for SAS 9.1

SAS 9.1 updates SAS/QC software with a new procedure and many enhancements to existing procedures.

## Analysis of Means

New for SAS 9.1, the ANOM procedure produces analysis of means (ANOM) charts for identifying group means, rates, or proportions that differ significantly from the overall average.

For instance, a manufacturing engineer might run an experiment to investigate which of six positions on a machine are producing output which differs from the overall average, while a health care system administrator might ask which medical groups are performing higher or lower proportions of Cesarean sections than the overall average proportion.



An ANOM chart is similar to a control chart, with a process summary statistic (such as a mean) plotted versus a treatment or group variable. Decision limits on the chart are used to determine which of the group means are significantly different.

ANOM provides an alternative to one-way analysis of variance (ANOVA) for fixed effects. ANOM differs from ANOVA in that it identifies the groups that are different, whereas ANOVA only determines whether a significant difference exists. ANOM has the additional advantage of a convenient graphical representation and lends itself to quality improvement applications in which the end user has limited background in statistics.

PROC ANOM can be applied to both variables and attribute data, and to equal and unequal sample sizes.

## Graphical Enhancements

Graphics are an integral part of any statistical quality improvement effort. Additional options have been added to the graphics in several of the SAS/QC procedures. In the CAPABILITY procedure, you can now juxtapose displays, including box-and-whisker plots, dot plots, and carpet plots, with histograms as aids for visualizing the distribution of a process. You can also specify upper and lower bounds for fitted kernel density estimates.

In the RELIABILITY procedure, recurrence and censoring ages can now be grouped into intervals. You can create probability plots when all failure modes act and plot cumulative distribution function estimates for individual modes on the same plot. You can also compute cumulative distribution function estimates and confidence limits when all modes act.

The SHEWHART procedure now allows you to provide combinations of missing values for the plotted statistic and control limits corresponding to a particular subgroup. For instance, you can now display an upper control limit but not a lower limit or central line for a specific point on a  $p$  chart, and you can suppress the control limits and central line for a missing point. Other options have been added for controlling the appearance of Shewhart charts.

## Three-Way Control Charts

An option has been added to the SHEWHART procedure that allows the process standard deviation to be estimated using a moving range of subgroup averages. This method can be used to construct three-way control charts as advocated by Wheeler (1995). A three-way control chart is useful when sampling, or within-group, variation is not the only source of variation. A three-way control chart comprises a chart of subgroup means, a moving range chart of the subgroup means, and a chart of subgroup ranges.

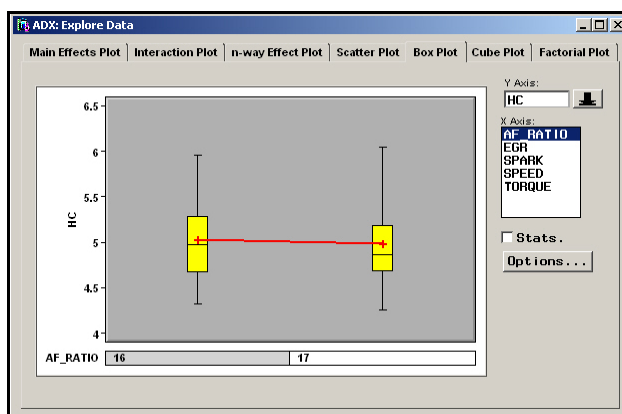
## Experimental Design Procedures

The OPTEX procedure now enables you to control how CLASS variables are modeled by specifying options for the ordering of levels and the parameterization of design matrix columns associated with the levels. In addition, the default parameterization has been changed to be orthogonal, providing efficiency values and parameter variances that are easier to interpret and to compare.

## ADX Interface for Design and Analysis of Experiments

The ADX Interface now enables you to create general factorial designs with factors having up to nine levels. You can also create two-level full factorial and minimum aberration fractional factorial generalized split-plot designs.

It is now possible to delete inactive factors and project a fractional-factorial design to a higher-resolution design. Also, the ADX Interface now honors block structure in a blocked design during design randomization.



Enhancements have also been made to the graphics, including the ability to join the means in a box plot.