

FAILURE TIMES OF BEARINGS

10. Model Checking with SPSS

In order to verify whether the assumption of normality is plausible for our data, you can use either normal quantile plot of observations or the normal quantile plot of residuals, the differences between each observation and its group mean. As SPSS doesn't provide a normal quantile plot for the residuals, we will obtain a normal quantile plot for each of the five groups.

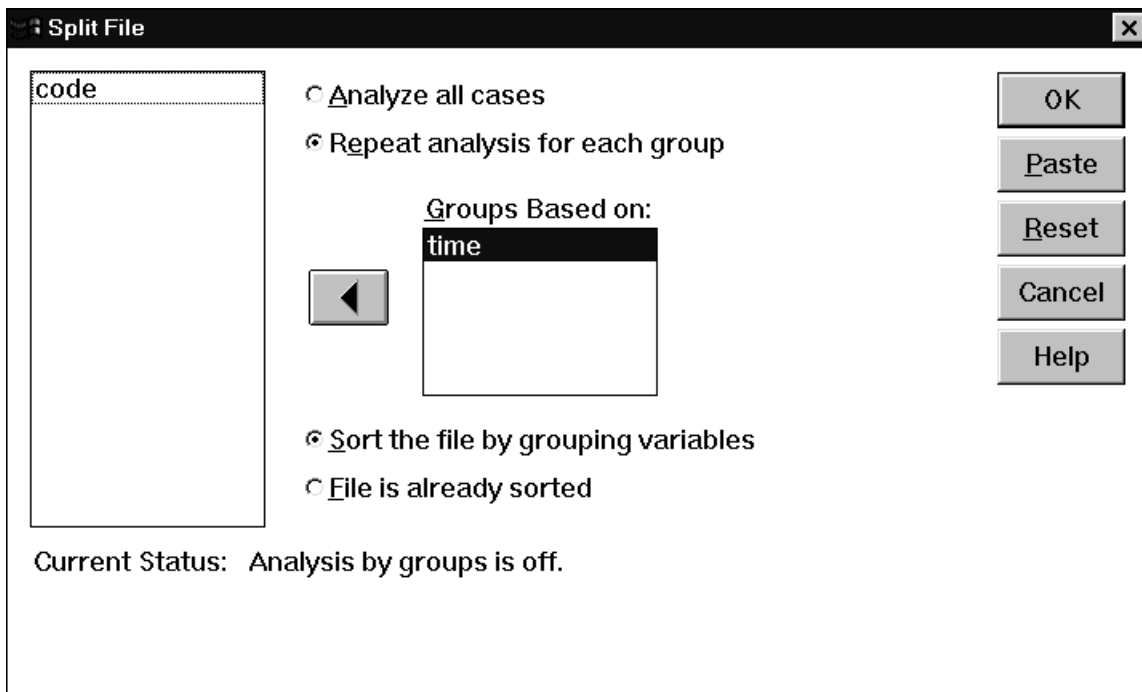
In order to determine whether or not a variable is normally distributed, you can use one of the two available procedures: *Normal Q-Q* plot or *Normal P-P* plot from the *Graphs* submenu.

The *Normal Q-Q* plot plots the quantiles of a variable's distribution against the quantiles of the normal distribution. If the data come from a normal distribution, the plot should resemble a straight line. The *Normal P-P* plot plots the cumulative proportions of a variable's distribution against the cumulative proportions of the normal distribution. Similarly, if the sample is from a normal distribution, points will cluster around a straight line.

We will produce the normal quantile plot of failure time for each of the five material groups. In order to apply the normal Q-Q plot feature in SPSS, it is necessary to split the original file into five smaller files corresponding to the five groups. We will use *Split File...* feature in *Data*.



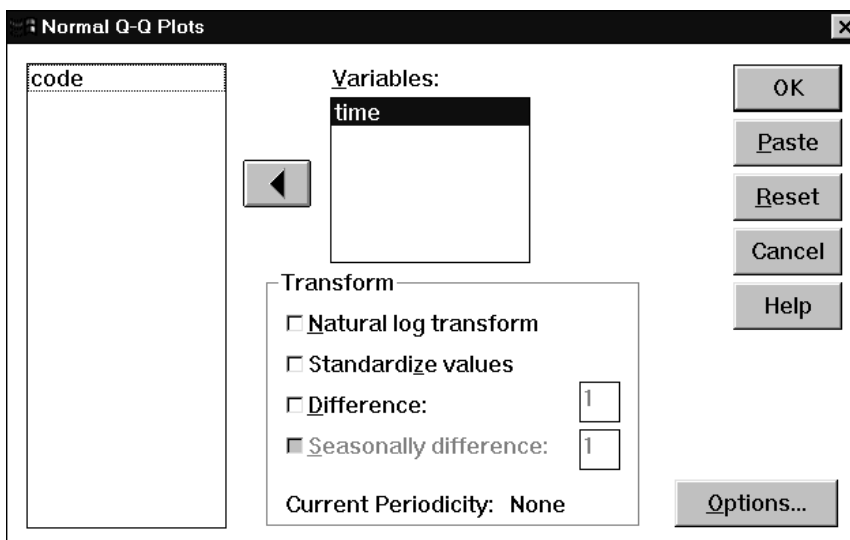
The *Split File* dialog box will be displayed. Fill out the dialog box in the following way:



Now we are ready to use the Normal Q-Q plot feature to check normality of the data. Click on *Graphs* in the main menu, and then on *Normal Q-Q...*



The *Q-Q Plots* dialog boxes is displayed. Fill out the box as follows:



Click OK. The normal probability plots for failure times for each of the five groups will be displayed. You can view them in **Section 6**.

If you now want to merge all six subfiles into the original file with the data for all six treatments, click on *Split File...* in *Data*, and check *Analyze All Cases* radio button.