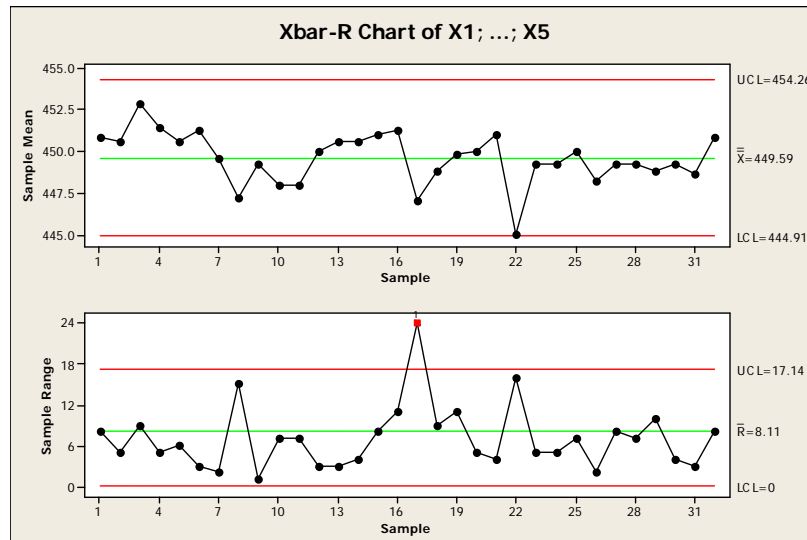# Minced Meat - Solution

The combination of the Xbar-chart and the R-chart turned out as follows:

We see the group means in the Xbar-chart are within the control limits, except possibly for group number 22 which is at the lower limit. For the R-chart we see that the range is outside the upper control limit for group no 17, and that there are large peaks within the control limit for group number 8 and 22. We see also that there are groups with dips in the Xbar-chart. This may indicate underweight packages in these groups that lead to both lower mean and increased variation. The so-called run-chart of the individual observations below reveals three clearly outlying observations, one in each of the groups 8, 17 and 22. Note that a single aberrant observation may not be sufficient to show up in the mean, so the combination with an R-chart turned out useful.
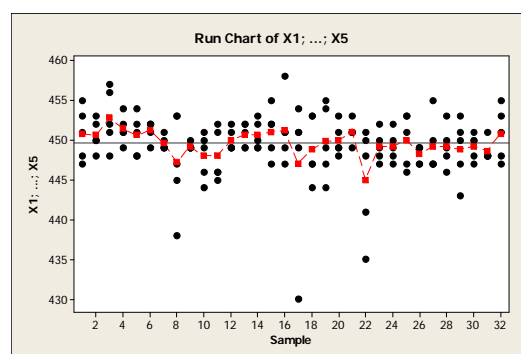
Going back to the data file we see that these three underweight packages are he first one in each group and this may indicate a common cause.

Remark: In the actual situation a clever guy in the group exclaimed: "These are exactly the instants where we changed catgut!" The group then realized that the first package after this had increased risk of being underweight, and the operational procedure was immediately rewritten to take this out.