

Mean and Range Charts

**Data Science for Quality Management:
Xbar and R / Xbar and S charts /
X and MR charts
with Wendy Martin**

Learning objectives:

Generate the Xbar and R Chart using R software

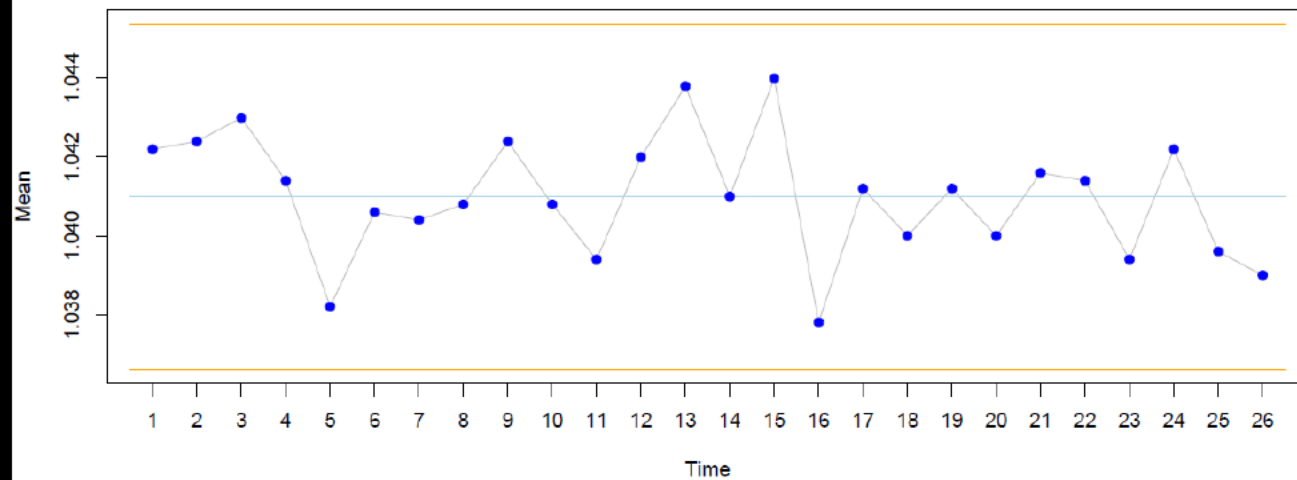
Assess the Xbar and R chart for process control

Step 5: Generate the Chart

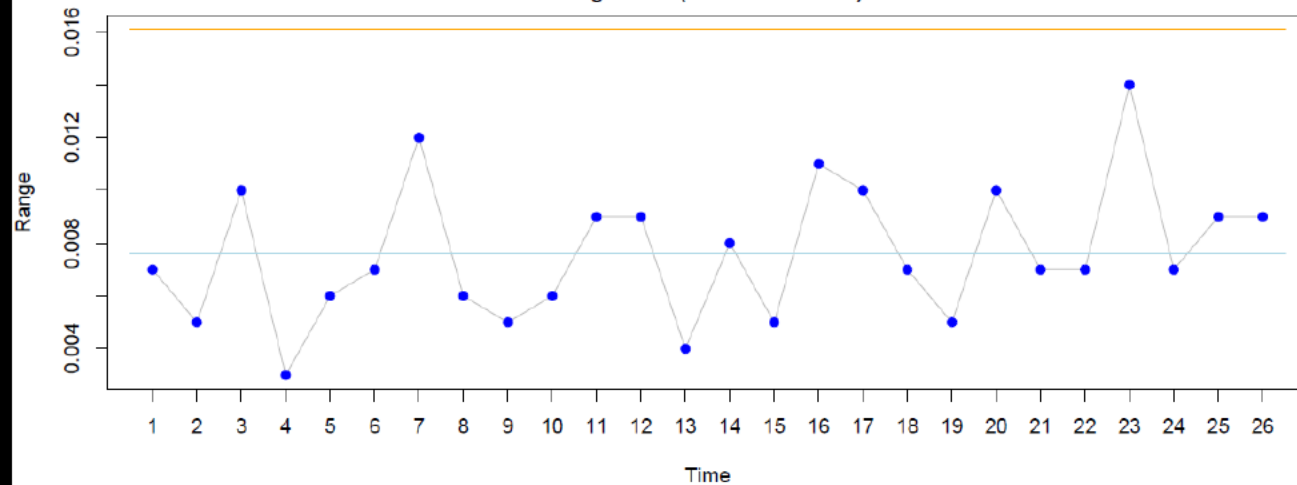
In R Studio

```
> spc.chart.variables.mean.and.meanrange()
```

Mean Chart (Mean Center Line)



Range Chart (Mean Center Line)



Step 6: Assess the Chart for Process Control

- Points outside of the control limits
- Runs
- Trends
- Cycles
- Unusual patterns of variation

Step 7: Assess the Process for Capability

- Assess the capability of the process due to spread
- Assess the capability of the process to produce within specification
- Assess the capability of the process to conform to target

Sources

The material used in the PowerPoint presentations associated with this course was drawn from a number of sources. Specifically, much of the content included was adopted or adapted from the following previously-published material:

- Luftig, J. An Introduction to Statistical Process Control & Capability. Luftig & Associates, Inc. Farmington Hills, MI, 1982
- Luftig, J. Advanced Statistical Process Control & Capability. Luftig & Associates, Inc. Farmington Hills, MI, 1984.
- Luftig, J. A Quality Improvement Strategy for Critical Product and Process Characteristics. Luftig & Associates, Inc. Farmington Hills, MI, 1991
- Luftig, J. Guidelines for Reporting the Capability of Critical Product Characteristics. Anheuser-Busch Companies, St. Louis, MO. 1994
- Spooner-Jordan, V. Understanding Variation. Luftig & Warren International, Southfield, MI 1996
- Luftig, J. and Petrovich, M. Quality with Confidence in Manufacturing. SPSS, Inc. Chicago, IL 1997
- Littlejohn, R., Ouellette, S., & Petrovich, M. Black Belt Business Improvement Specialist Training, Luftig & Warren International, 2000
- Ouellette, S. Six Sigma Champion Training, ROI Alliance, LLC & Luftig & Warren, International, Southfield, MI 2005