Purpose of a Control Chart

Data Science for Quality Management: Understanding Process Variation

with **Wendy Martin**

Learning objective:

State the purpose of of a control chart

Common or Special?

- The typical challenge in a business or industrial environment may be simply stated:

Common or Special?

- ‘How can we determine which patterns of variation are attributable to common causes, and which are attributable to special causes?’

3 Important Points

1. We **must eliminate** the **special causes** of variation to establish process control (and to identify the true capability of the process)

3 Important Points

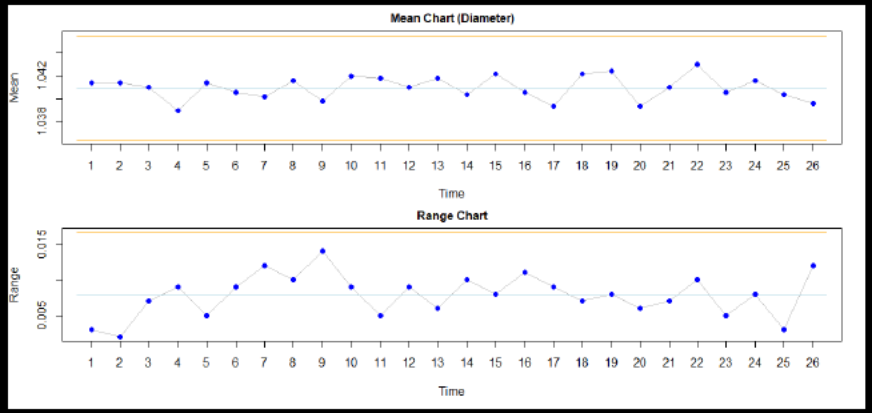
2. Once process control has been established, we **must assess** and **reduce** the **common causes** of variation affecting the process.

3 Important Points

3. The **responsibility** for the corrective actions necessary to eliminate common and special causes of variation **rests with different personne**l.

Primary Purpose of a Control Chart

- Control charts provide us with the ability to distinguish between common and special causes of variation



What is Process Improvement?

- A common misconception is that when a process that is out of control is brought into a state of control, the process has been improved.
- This is simply **not true**!

What is Process Improvement?

- Identifying and eliminating special causes of variation is removing ‘noise’ from the process, which prevents us from understanding and identifying the **true** process.

What is Process Improvement?

- Process improvement takes place **only** when **common causes** of variation, inherent (internal) to the process are ***reduced***.

2 Factors that Affect Process Quality

- Regardless of the process being studied, its efficiency/productivity and quality of output are largely a function of 2 factors:

2 Factors that Affect Process Quality

1. The design of the process
2. The way that the process is operated and controlled

Design Quality

The appropriateness of the nominal / target and specification(s) for the quality characteristics of the product or service to meet the needs of the customer(s) at an optimal level (highest quality, lowest cost).

Design Quality

Typically relates to form, fit, function, use, reliability, and / or safety.

Design Quality

Nominals and specifications are preferably obtained through appropriate engineering design, testing, and analysis; often through the deployment of an Advanced Quality Planning Process (AQPP).

Conformance Quality

The consistency with which each unit of product delivered, or each incident of service provided, is faithful to the design requirements (Nominal & Specifications) associated with the quality characteristic(s) for that product or service.

Summary

Design Quality: Knowing the right targets

Conformance Quality: Hitting those targets consistently

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
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