Introduction to Process Capability

Data Science for Quality Management: Process Capability

with **Wendy Martin**

Learning objective:

Differentiate between process control and process capability

Process Capability

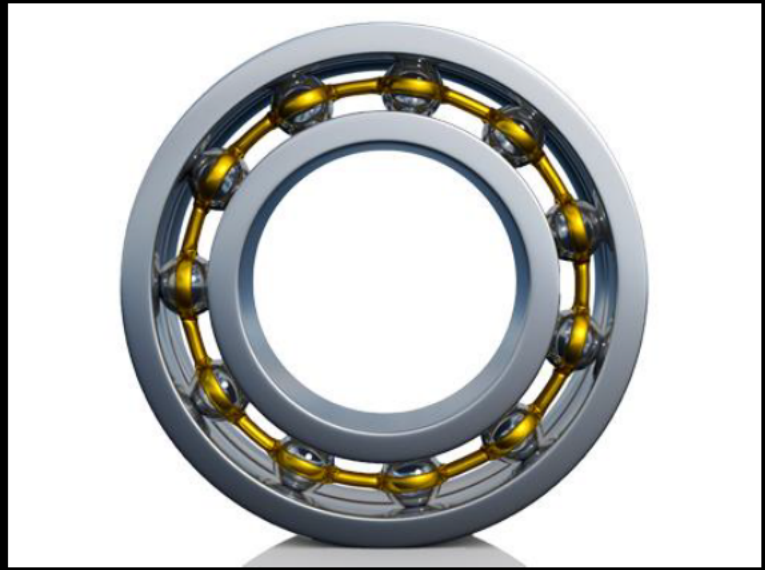
- Conformance to design specifications
- Requires a state of control (versus process performance analysis)
- Involves assessing variability and central tendency for variables data

Process Capability

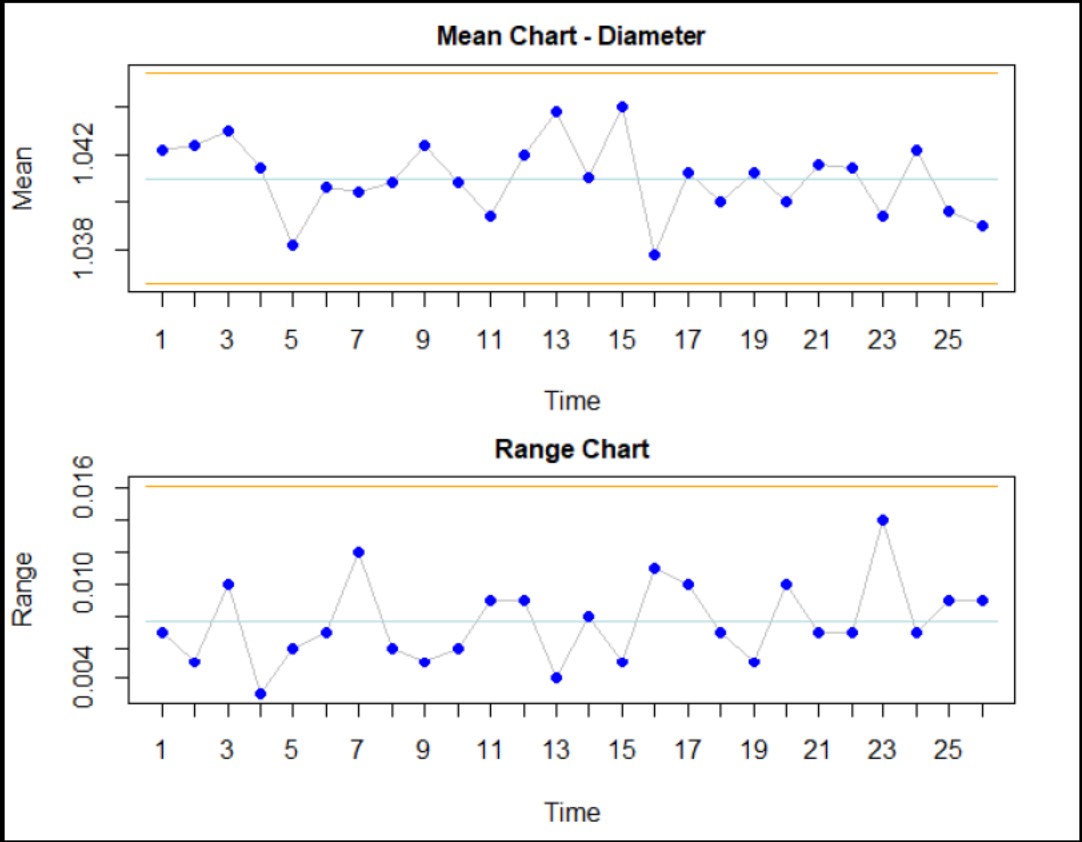
- Involves comparing performance, usually determined by the expected value (mean), or comparison to a standard for attributes data

The Case of the Cartridge Bearing

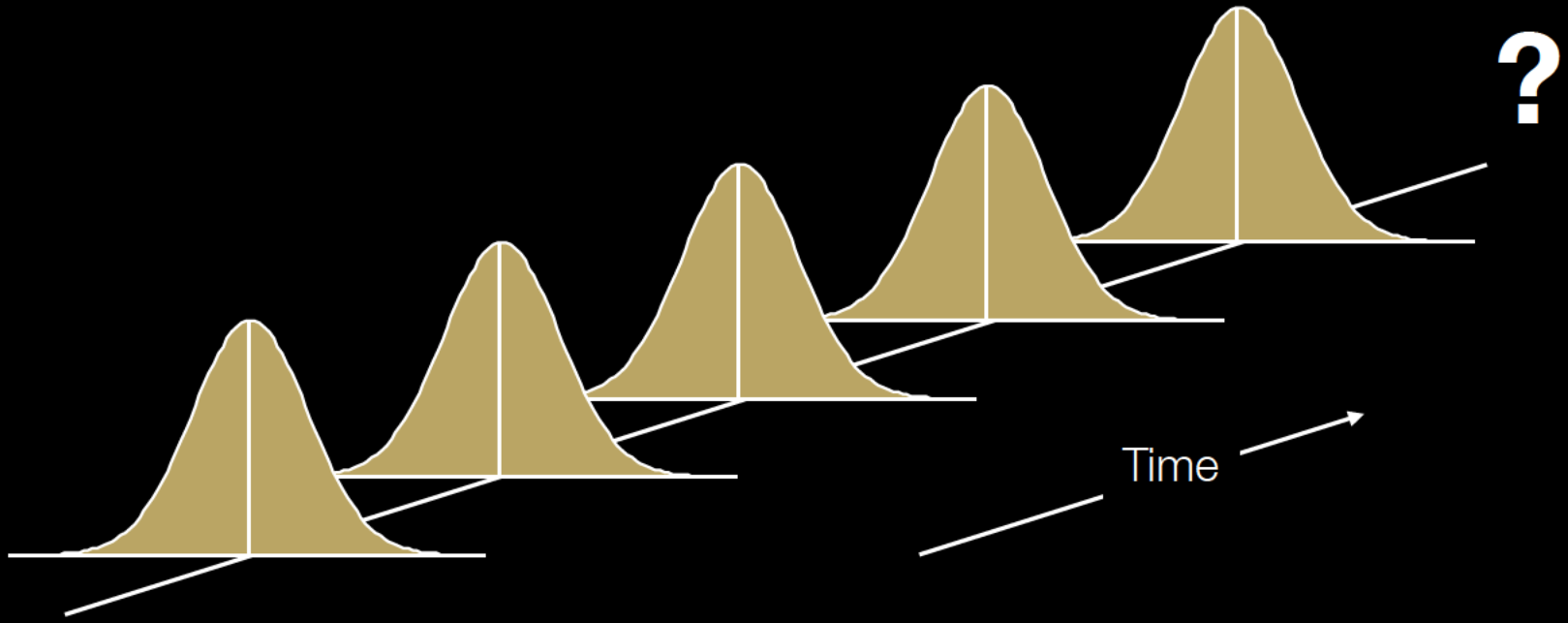
- Consider a forming operation in which the outside ring of a cartridge bearing heated treated, then ground to customer specifications of 1.041” ± 0.006”.



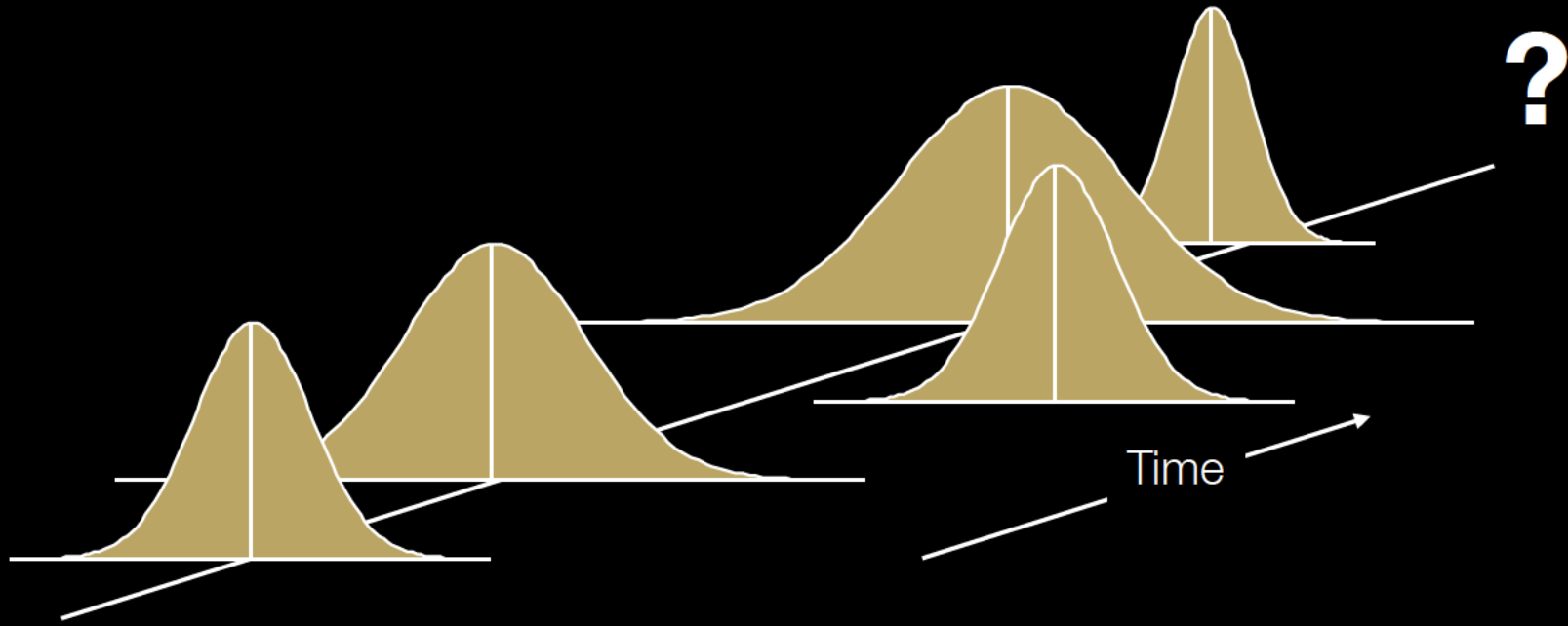
Step 5: Generate Chart



A Process Affected by Only Common Causes of Variation



A Process Affected by Special Causes of Variation



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

- Estimate the process average
- Estimate the natural tolerance of the process
- Assess the potential of the process to be capable if properly targeted, based upon spread (dispersion); the C_p Index

Step 7 — Assess the Process for Capability

- Assess the capability of the process to conform to specification(s); the C_{pk} Index
- Assess the capability of the process to conform to target (a true capability assessment); the C_{pm} Index

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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- Ouellette, S. Six Sigma Champion Training, ROI Alliance, LLC & Luftig & Warren, International, Southfield, MI 2005