np Charts: Control Charts for Proportions / Percentages

Data Science for Quality Management: Control Charts for Discrete Data

with **Wendy Martin**

Learning objectives:

Assess the np chart for process control

Create a Pareto Chart

Calculate an estimate for process capability

Step 6: Assess the Process for Control

- Our process log indicates that we eliminated a supplier, FBN, Inc. (or Fly By Night, Inc.).

- This supplier still believes that quality means conforming to specifications and that their quality problems result from an inadequate number of slogans in the plant.

Step 6: Assess the Process for Control

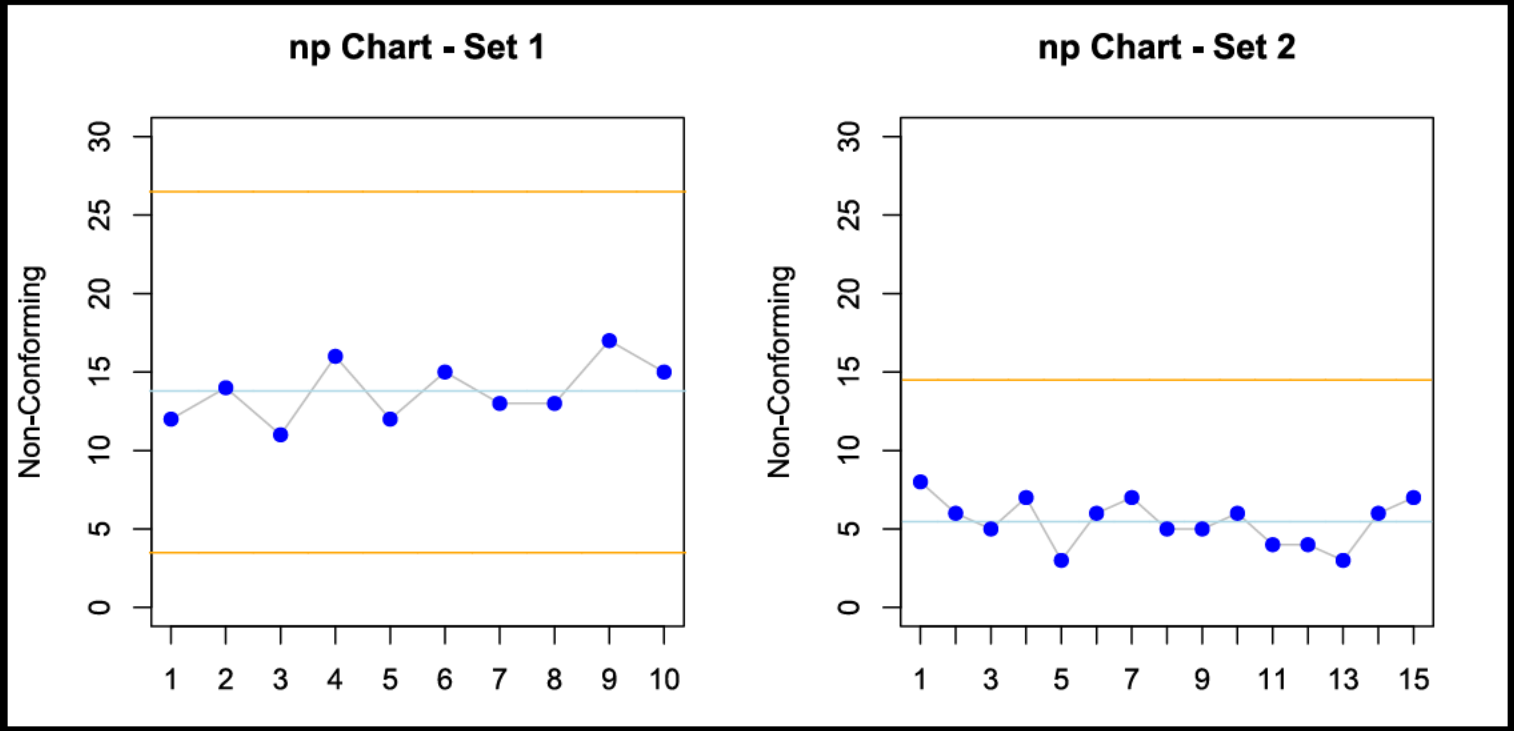
- The management group supported the decision to eliminate this supplier, based on quality.

- In this case, the supplier in question was another division of the company.

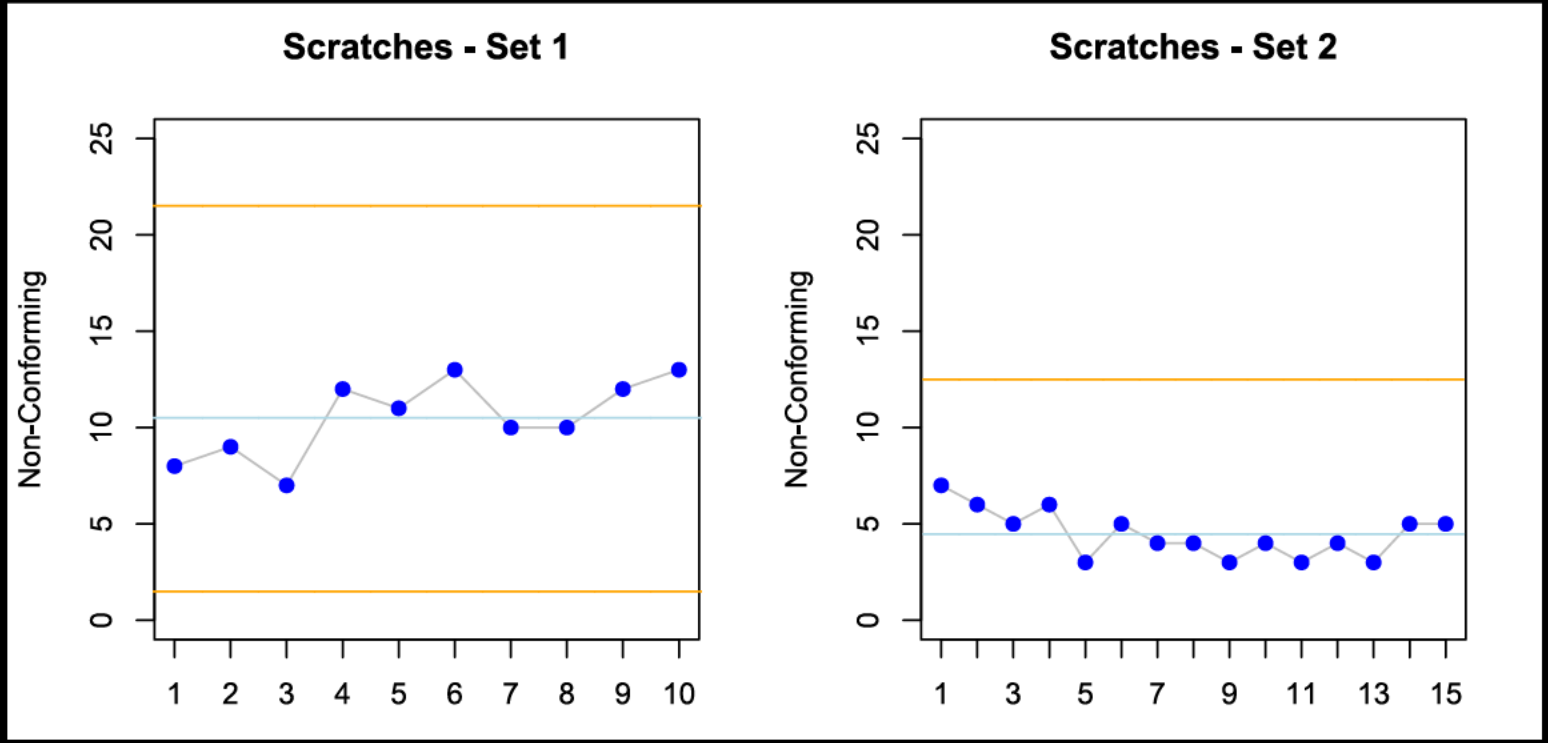
Step #6 — Assess the Process for Control

- Since you can assign the cause of the process shift to the elimination of a supplier, you split the data into two sections.
- Go ahead and give it a try! What did you find?

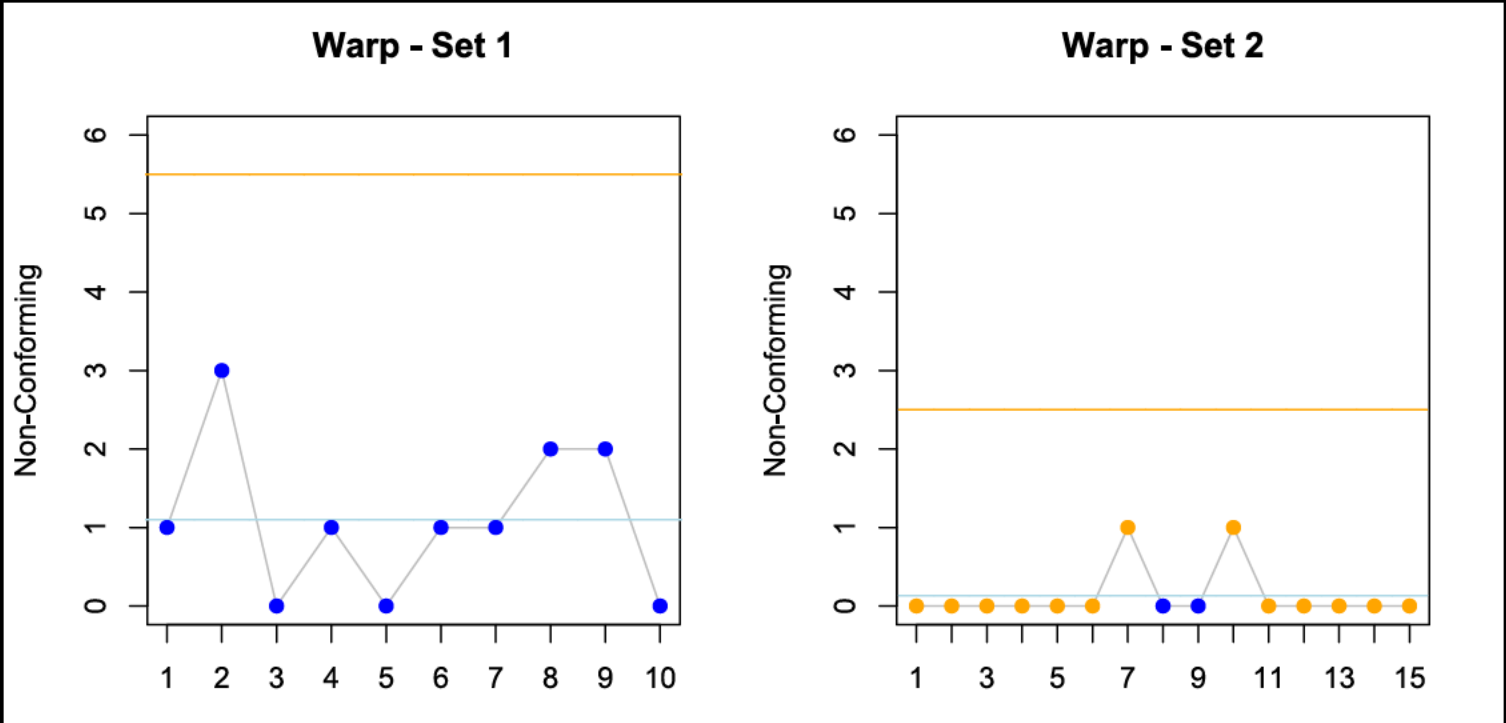
Plot the Control Chart(s) II
Total



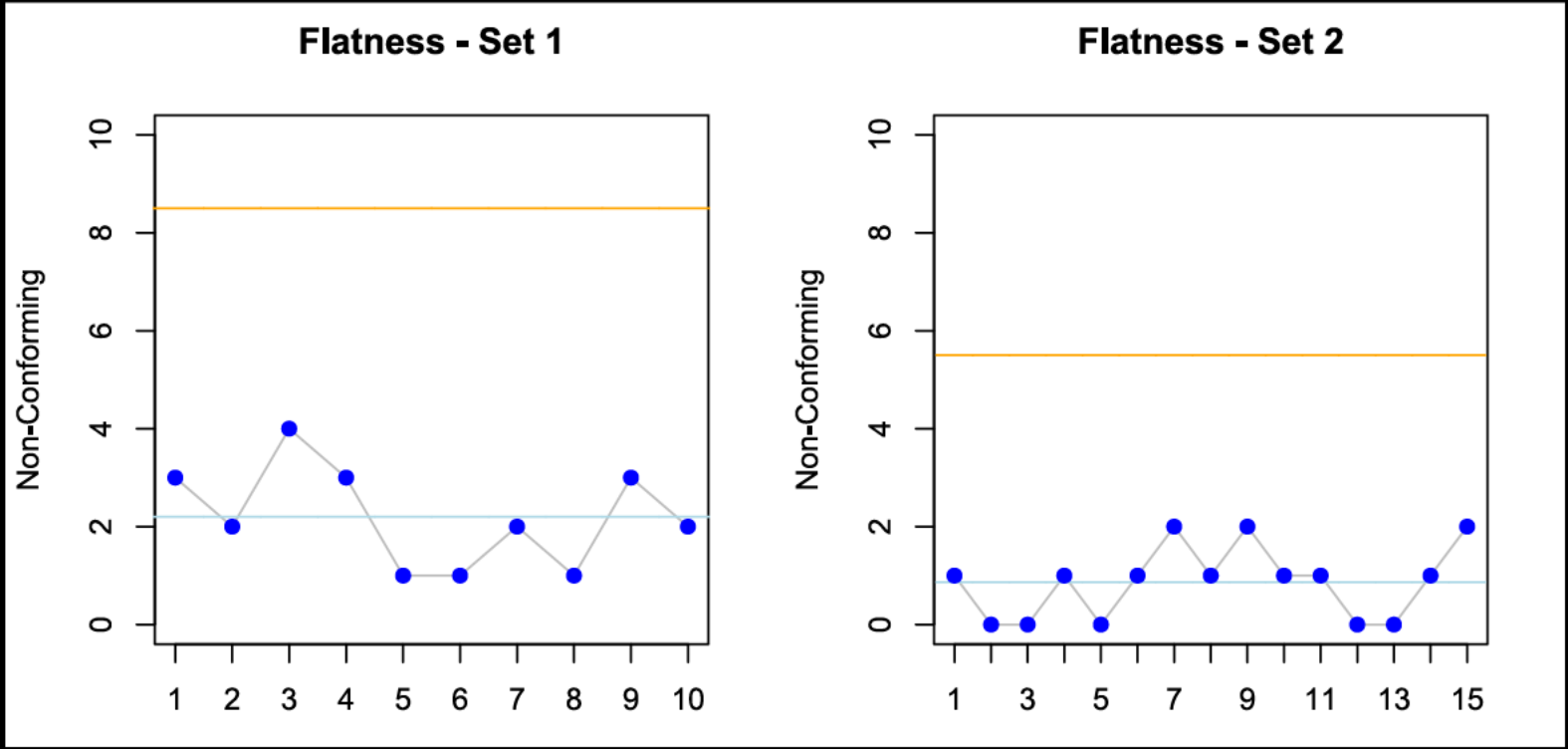
Plot the Control Chart(s) II
Scratches



Plot the Control Chart(s) II
Warp



Plot the Control Chart(s) II
Flatness



Step 7: Assess Process Capability

- If the process control chart reflects a state of statistical control, you can assess the process for capability
- As with the p chart, we need to calculate $\bar{p}$

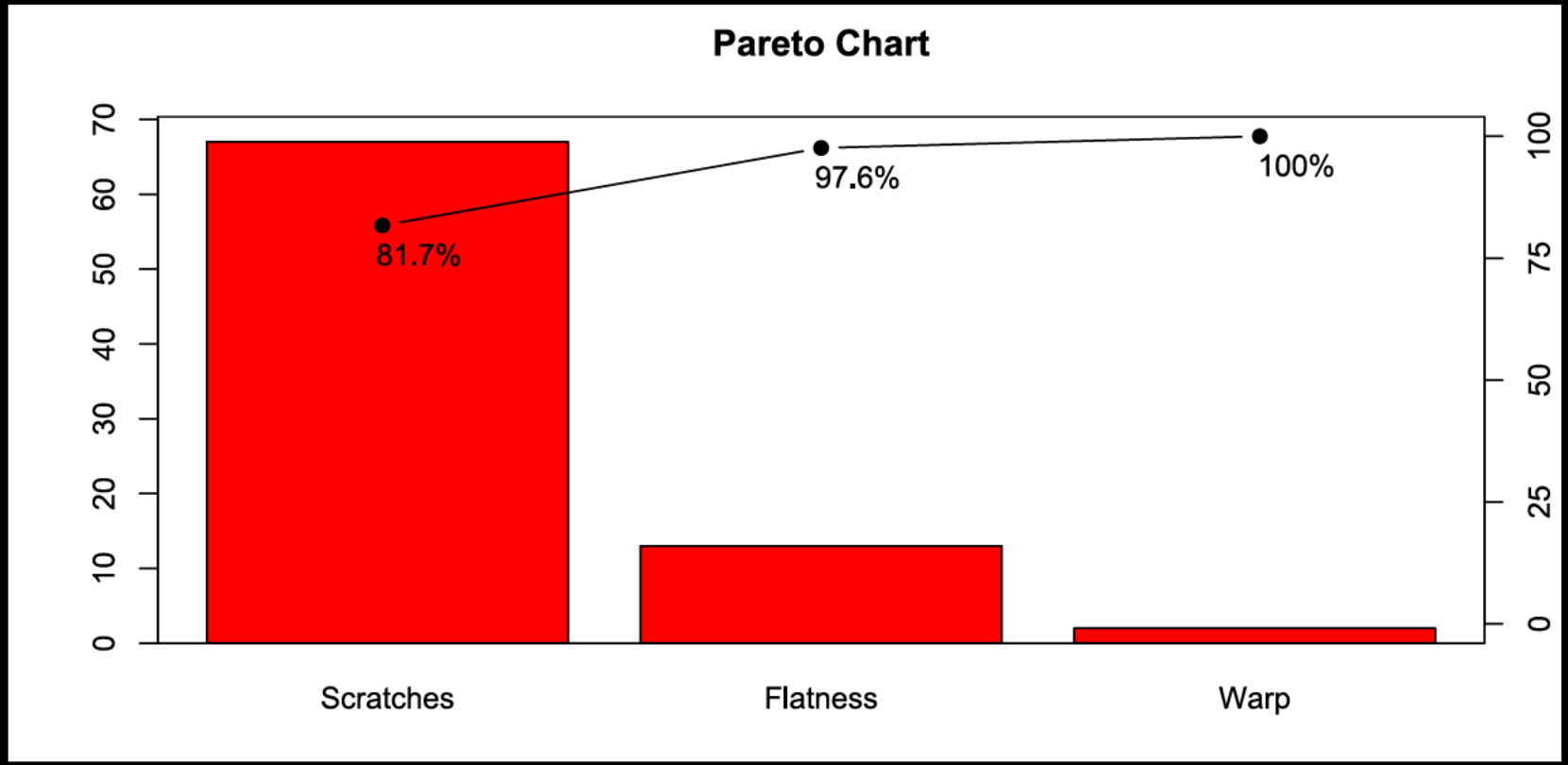
$$\bar{p}_{Total} = 0.001093$$

or 1093 ppm

Conclusions

- After investigation, you found that removal of an internal supplier lowered the nonconforming rate
- Monitoring each characteristic separately allowed us to see the effect of the material suppliers on each characteristic
- How would you decide on which defect to work on?

Conclusions



Conclusions

- Using the Pareto chart, you would probably recommend an effort to reduce scratches

- Warp is dropping below detectable limits.
  - What would you do then?

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