

Practical Strategies for Process Improvement (PSPI)

Custom Two-Week Course

Pre-work:

Prior to the first week of the course, the participants should have:

1. Identified a process for improvement and relevant questions about this process to be investigated through data acquisition plans.
2. Begun a process map on the process identified for their project

Week 1:

Day 1 Topics

- Introduction to the nature of variation and its impact on ability to improve processes
- Special cause / common cause model of sources of variation
- Uses of control charts to assess stability using attributes data
- The impact of sampling and subgrouping strategies (illustrated with p and c charts).
- Review of project objectives and work on process maps

Day 2 Topics

- Uses of control charts to investigate sources of variation and assess stability on continuous measurements
- Assessing stability over time using individuals charts and moving range charts
- Use of X-bar and R charts to investigate within subgroup and between subgroup sources of variation
- Sampling and subgrouping issues associated with variables control charts

Day 3 Topics

- Case study to illustrate the importance of the subgrouping strategy and its use to focus process work
- Measurement studies – establishing control of a measurement process
- Measurement studies to understand the resolution, discrimination and accuracy of a measurement process

Day 4 Topics

- Introduction to components of variation using sampling trees
- Using sampling trees to plan studies to understand hierarchical sources of variation in a process
- Case study of components of variation and a measurement process
- Individual work on projects to develop plans to acquire data in order to understand where the largest sources of variation are in their processes

Day 5 Topics

- Sampling and subgrouping for spatial situations
- Individual presentations of *Go-Forward Plans* for process improvement work and proposed data acquisition strategies

Week 2:

Day 1 Topics

- Presentations of process improvement work
- Review of 2-level nested component of variance studies
- Understanding the difference in what can be learned with crossed studies, nested studies, and studies with systematic (i.e., fixed) effects
- How the analysis of nested studies differs from the analysis of sampling studies with crossed and systematic effects
- A view of measurement studies using components of variation

Day 2 Topics

- Introduction to statistical tolerancing
- Case study using statistical tolerancing in an assembly process
- Correlation studies
- Assessing historical and online data with regression

Day 3 Topics

- Interpreting and understanding the use of process capability studies
- Introduction to designed experiments using full factorial experiments
- Introduction to the airplane experiment

Day 4 Topics

- Introduction to fractional factorial experiments
- Planning issues with designed experiments
- Experimental design case study
- Airplane experiment with fractional factorials

Day 5 Topics

- Airplane fly-off
- Plans for future process study