

***Six Sigma Quality: Concepts & Cases - Volume II
Lean and Statistical Tools in Six Sigma DMAIC Process with
MINITAB® Applications***

Written by:

Prof. Amar Sahay, Ph.D.

B.S. Production Engineering (India)
M.S. Industrial Engineering (USA)
Ph.D. Mechanical Engineering (USA)
(Ph.D. emphasis in Manufacturing Systems, CAD/CAM and Quality Engineering)
Senior Members of Institute of Industrial Engineers, USA; Society of Manufacturing Engineering (USA), American Society for Quality (ASQ, USA)
Member of NAFSA (Association of International Educators, USA)
Member of AEA (American Education Evaluation Association)
Professor of Operations and Supply Chain, over 17 years of teaching, training, research and consulting experience
Author of 4 books in Six Sigma; more than 35 articles/research papers in national and international journals and conference proceedings

This book has been tested in Six Sigma training courses, undergraduate and graduate courses in Quality Management, Quality Engineering, MBA and Executive MBA courses. The content of the training courses are consistent with ASQ (American Society for Quality) and other agencies and universities offering Six Sigma education, training, and certification in the U.S.

Brief Content of Volume II

***Six Sigma Quality: Concepts and Cases - Volume II
Statistical Tools in Six Sigma DMAIC Process with
MINITAB Applications***

Volume II contains approximately 890 pages and focuses on the **ANALYZE**, **IMPROVE**, and **CONTROL** phases of Six Sigma. This volume contains numerous examples, cases, and hands-on exercises using the MINITAB statistical software that allows one to master the Six Sigma concepts. The text provides step-wise computer instructions to learn and apply the Six Sigma tools in real world. This volume contains:

Six Sigma Analysis Tools with Computer Applications

- The concepts, cases and detailed discussion on Six Sigma Analysis Tools with numerous examples
- MINITAB applications with step-wise instructions

Brief Content of volume II:

Presentation and Organization of Data

Descriptive Statistics: Graphical and Numerical Methods

Probability Concepts

Discrete Probability Distributions (with computer applications and simulations)

- Frequency Distribution and Probability Distributions
- Expected Value, Variance, and Standard Deviation of a Discrete Distribution
- Binomial Distribution and Applications
- Approximating Binomial Distribution with Normal Distributions
- Poisson Distribution
- Poisson Approximation
- Hypergeometric Distribution
- Geometric Distribution
- Negative Binomial or Pascal Distribution
- Multinomial Distributions
- Discrete Uniform Distribution

Continuous Probability Distributions (with computer applications and simulations)

- Normal Distribution
- Important Properties of Normal Distribution
- Distributions Related to Normal Distribution: t-distribution, F-distribution, Chi-Square Distribution
- Computer Applications: Checking Distributions using Probability Plots
- Fitting Distributions to Data using MINITAB
- Exponential Distribution and Applications
- Simulating Data from Exponential Distribution
- Uniform Distribution and Random Samples
- The Lognormal distribution
- The Weibull Distribution
- Gamma Distribution
- Beta Distribution

Sampling and Sampling Distribution

- Sampling Techniques
- Random Sampling using MINITAB

Lean Six Sigma: Training/Certification Books and Resources

- Sampling Distribution
- Central Limited Theorem
- Sampling Distribution of the Sample Proportion
- Sampling from Normal and Non normal Distributions
- Computer Simulations: Sampling Applications

Inference Procedure: Parameter Estimation

- Point Estimate: Properties of Estimators
- Confidence Interval Estimation
- Confidence Interval for a Single Mean and Proportion
- Confidence Interval for the Difference between Two Means and Two Proportions
- Confidence Interval for the Variance and Ratio of Two Variances
- Sample Size Determination
- Computer Applications

Inference Procedure: Hypothesis Testing

- Statistical Hypothesis: Concepts
- Type I and Type II Errors
- One-sided and Two-sided Hypothesis Tests
- Test of Hypothesis on the Mean, Variance Known
- Choice of Sample Size
- Relationship to Confidence Interval
- Test of Hypothesis for the Equality of Two Means: Equal and Unequal Variance
- Sample Size Determination
- The Paired t-test
- Test of Hypothesis on One Variance, Two Variances
- Test of Hypothesis on One and Two Proportions

Chi-Square Goodness-of-fit Tests

Nonparametric Tests

Regression and Correlation Analysis and Model Building

Analysis of Variance (ANOVA): Fixed and Random Effect Model

Six Sigma Improvement Tools with Computer Applications

Design of Experiment (DOE) Techniques with Applications and Computer Cases and Instructions:

- Experimentation
- One-factor Design
- Analysis of Variance (ANOVA)

Lean Six Sigma: Training/Certification Books and Resources

- Two-factor/Three-factor and Four-factor Designs
- Mult-vari Charts
- Randomized Block Design
- Latin Square Design
- Factorial Designs
- 2k Design
- Two-level Fractional Factorial Designs
- Three-level Fractional factorial Design
- Blocking and Confounding
- Resolution III, IV Designs
- Response Surface Methodology
- Central Composite Designs
- Plakett Burman Design
- Taguchi Method/Process Optimization
- Computer Applications of above designs

Other Improvement Techniques

- JIT and Kaizen (Continuous Improvement)
- Cycle Time Reduction/ Agility
- Process Reengineering
- Process Maps/ High Level Process Maps
- Value Stream Mapping
- Kaizen Blitz/ Poka-yoke
- Lean Principles

Six Sigma Control Tools with Computer Applications

Quality Concepts

- Quality Costs/Quality and Productivity
- Statistical Methods in Quality Improvement
- Describing Variation/Inference about process quality
- Modeling Process Quality
- Quality Audits/Inspection and Planning

Statistical Process Control

- Chance and Assignable Causes of Variation
- Control Chart Theory
- Statistical Basis of Control Chart
- Why and How Control Charts Work
- Types of Control Charts
- Control Limits/Sample Size and Frequency
- Rational Subgroup
- Analysis of Patterns in Control Charts

Lean Six Sigma: Training/Certification Books and Resources

- Manufacturing and Non-manufacturing Applications of Control Charts
- Computer Applications

Variables Control Charts

- Control Charts for \bar{x} and R
- Control Chart for S^2
- Control Chart for S
- Individual Charts
- Median Charts
- Applications and Guidelines for Implementing Control Charts
- Computer Applications

Other Variables Control Charts

- CUSUM Chart
- EWMA Chart
- Control Charts for Short-run Production
- Selection of Control Charts
- Computer Applications

Attribute Control Charts

- The p-chart
- np-Chart
- c-chart
- u-chart/ The OC Curve and applications

In addition, other tools used in Lean and Design for Six Sigma are available separately.

Training material can be obtained online once you register for training or can be purchased through our website. To purchase the training material click on appropriate link or send us an e-mail for additional information and purchase inquiry using the 'contact us' tab on the website.