Lean Six Sigma Black Belt Agenda

Six Sigma and Organizational Goals

Value of Six Sigma
Organizational goals and Six Sigma projects
Organizational drivers and metrics
Design for Six Sigma (DfSS) Methodologies

1.0 Define Phase

1.1 The Basics of Six Sigma

1.1.1 Meanings of Six Sigma
1.1.2 General History of Six Sigma & Continuous Improvement
1.1.3 Deliverables of a Lean Six Sigma Project
1.1.4 The Problem Solving Strategy Y = f(x)
1.1.5 Voice of the Customer, Business and Employee
1.1.6 Six Sigma Roles & Responsibilities

1.2 The Fundamentals of Six Sigma

1.2.1 Defining a Process
1.2.2 Critical to Quality Characteristics (CTQ's)
1.2.3 Cost of Poor Quality (COPQ)
1.2.4 Pareto Analysis (80:20 rule)
1.2.5 Basic Six Sigma Metrics
   a. including DPU, DPMO, FTY, RTY Cycle Time; deriving these metrics

1.3 Selecting Lean Six Sigma Projects

1.3.1 Building a Business Case & Project Charter
1.3.2 Developing Project Metrics
1.3.3 Financial Evaluation & Benefits Capture
1.3.4 Project plannign tools- CPM, PERT
1.3.4 Project risk Analysis
1.3.4 Project closure

1.4 The Lean Enterprise

1.4.1 Understanding Lean
1.4.2 The History of Lean
1.4.3 Lean & Six Sigma
1.4.4 The Seven Elements of Waste
a. Overproduction, Correction, Inventory, Motion, Overprocessing, Conveyance, Waiting.
1.4.5 5S
   a. Straighten, Shine, Standardize, Self-Discipline, Sort

1.5 Team Dynamics and Performance

Team stages and dynamics

Team roles and responsibilities
Team tools
Team Communication

2.0 Measure Phase

2.1 Process Definition

2.1.1 Cause & Effect / Fishbone Diagrams
2.1.2 Process Mapping, SIPOC, Value Stream Map
2.1.3 X-Y Diagram
2.1.4 Failure Modes & Effects Analysis (FMEA)

2.2 Six Sigma Statistics

2.2.1 Basic Statistics
2.2.2 Descriptive Statistics
2.2.3 Normal Distributions & Normality
2.2.4 Graphical Analysis

2.3 Measurement System Analysis

2.3.1 Precision & Accuracy
2.3.2 Bias, Linearity & Stability
2.3.3 Gage Repeatability & Reproducibility
2.3.4 Variable & Attribute MSA

2.4 Process Capability

2.4.1 Capability Analysis
2.4.2 Concept of Stability
2.4.3 Attribute & Discrete Capability
2.4.4 Monitoring Techniques

3.0 Analyze Phase

3.1 Patterns of Variation

3.1.1 Multi-Vari Analysis
3.1.2 Classes of Distributions

3.2 Inferential Statistics

3.2.1 Understanding Inference
3.2.2 Sampling Techniques & Uses
3.2.3 Central Limit Theorem

3.3 Hypothesis Testing

3.3.1 General Concepts & Goals of Hypothesis Testing
3.3.2 Significance; Practical vs. Statistical
3.3.3 Risk; Alpha & Beta
3.3.4 Types of Hypothesis Test

3.4 Hypothesis Testing with Normal Data

3.4.1 1 & 2 sample t-tests

3.4.2 1 sample variance

3.4.3 One Way ANOVA

a. Including Tests of Equal Variance, Normality Testing and Sample Size calculation, performing tests and interpreting results.

3.5 Hypothesis Testing with Non-Normal Data

3.5.1 Mann-Whitney

3.5.2 Kruskal-Wallis

3.5.3 Mood's Median

3.5.4 Friedman

3.5.5 1 Sample Sign

3.5.6 1 Sample Wilcoxon

3.5.7 One and Two Sample Proportion

3.5.8 Chi-Squared (Contingency Tables)

a. Including Tests of Equal Variance, Normality Testing and Sample Size calculation, performing tests and interpreting results.

4.0 Improve Phase

4.1 Simple Linear Regression

4.1.1 Correlation

4.1.2 Regression Equations

4.1.3 Residuals Analysis

4.2 Multiple Regression Analysis

4.2.1 Non- Linear Regression

4.2.2 Multiple Linear Regression

4.2.3 Confidence & Prediction Intervals

4.2.4 Residuals Analysis

4.2.5 Data Transformation, Box Cox

4.3 Designed Experiments

4.3.1 Experiment Objectives

4.3.2 Experimental Methods

4.3.3 Experiment Design Considerations

4.4 Full Factorial Experiments

4.4.1 2k Full Factorial Designs

4.4.2 Linear & Quadratic Mathematical Models

4.4.3 Balanced & Orthogonal Designs

4.4.4 Fit, Diagnose Model and Center Points

4.5 Fractional Factorial Experiments

4.5.1 Designs

4.5.2 Confounding Effects
4.5.3 Experimental Resolution

4.6 Lean Tools
4.6.1Waste Elimination
4.6.2 Cycle time reduction
4.6.3 Kaizen and Kaizen blitz

5.0 Control Phase

5.1 Lean Controls
5.1.1 Control Methods for 5S
5.1.2 Kanban
5.1.3 Poka-Yoke (Mistake Proofing)

5.2 Statistical Process Control (SPC)
5.2.1 Data Collection for SPC
5.2.2 I-MR Chart
5.2.3 Xbar-R Chart
5.2.4 U Chart
5.2.5 P Chart
5.2.6 NP Chart
5.2.7 X-S chart
5.2.8 CumSum Chart
5.2.9 EWMA Chart
5.2.10 Control Methods
5.2.11 Control Chart Anatomy
5.2.12 Subgroups, Impact of Variation, Frequency of Sampling
5.2.13 Center Line & Control Limit Calculations

5.3 Six Sigma Control Plans
5.3.1 Cost Benefit Analysis
5.3.2 Elements of the Control Plan
5.3.3 Elements of the Response Plan

5.4 Lean Tools for Process Control
5.4.1 Total productive maintenance (TPM)
5.4.2 Visual factory

The Consolidated Black Belt training comprises of 10 days of trainings of 80 hours, the first 5 days are Green Belt training and other 5days are devoted to Black Belt training topics. Online pre-session is for 30 hours. Participants have to complete one project or case study under the guidance of Master Black Belt and this interaction is of 10-hour duration spread over 6 months. They also have access to 32 hours online training session which they need to complete before appearing for the exam.