CONCEPT

Lean Six Sigma for Process Improvement Projects: DMAIC Tools and Statistics

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Technical depth: Practitioner · **Practical mode:** Modelling build

Introduction

Improvement projects often stall because the problem is poorly scoped, the data cannot be trusted or the chosen solution treats a symptom rather than a verified cause. Gains that are achieved then fade within months because no control plan was put in place. This course combines Lean flow analysis with the Six Sigma DMAIC method set out in ISO 13053, and trains managers to build each statistical analysis a project needs. Participants work on datasets from several sectors and leave with a DMAIC Project Storyboard for an improvement project in their own organisation.

Course Objectives

- Select and scope an improvement project with a charter, a CTQ tree and a cost of poor quality baseline
- Validate a measurement system and establish baseline process capability and sigma level
- Verify root causes with Pareto analysis, hypothesis testing and regression rather than opinion
- Develop and test improvements using design of experiments, Pugh selection and process FMEA
- Hold the gains with control charts, a control plan and a response plan
- Build a DMAIC Project Storyboard that quantifies benefits for tollgate approval

Target Audience

- Managers leading cross-functional process improvement projects
- Process owners accountable for defect, cost or cycle-time performance
- Operational excellence and quality managers coordinating improvement portfolios
- Project managers applying structured problem solving to operational projects
- Service and shared-services managers responsible for high-volume transactional processes

Course Outline

Day 1: Improvement Project Foundations

- Lean Six Sigma Roles and Competencies in ISO 18404:2015
- Project Selection with a Benefit-Effort Prioritisation Matrix
- Project Charter: Problem Statement, Goal and Scope
- Voice of the Customer and CTQ Tree Construction
- Cost of Poor Quality Baseline Estimation

Day 2: DMAIC Methodology and Measurement

- ISO 13053-1 DMAIC Phase Deliverables and Tollgate Reviews
- Data Collection Plan and Operational Definitions
- Measurement System Analysis with Gauge R&R
- Process Capability Indices Cp, Cpk and Ppk per ISO 22514-2:2026
- Sigma Level and DPMO Calculation

Day 3: Analysing and Verifying Root Causes

- Pareto Analysis and Data Stratification in Minitab or Excel
- Hypothesis Testing: t-Tests, ANOVA and Chi-Square
- Correlation and Simple Linear Regression Modelling
- Value Stream Analysis of Queue Time and Bottlenecks
- Cause-and-Effect Matrix Prioritisation

Day 4: Improve, Control and Project Risk

- Two-Level Full Factorial Design of Experiments
- Solution Selection with the Pugh Matrix
- Process FMEA Using the AIAG-VDA Seven-Step Approach
- Statistical Process Control Charts per ISO 7870-2:2023
- Control Plan and Response Plan Design

Day 5: Modelling Build and the DMAIC Storyboard

- Call-Centre Handling-Time Dataset: Capability and Regression Build
- Manufacturing Defect Dataset: Control Chart and Factorial Analysis Build
- Benefits Realisation Calculation and Financial Validation
- DMAIC Project Storyboard Assembly
- Tollgate Review Panel and Storyboard Defence

Skills You Will Gain

- Project Scoping
- Measurement System Analysis
- Process Capability Analysis
- Statistical Root Cause Verification
- Design of Experiments
- Failure Mode Analysis
- Statistical Process Control
- Benefits Quantification

Why Attend This Course

- Leave with a DMAIC Project Storyboard for a live project, tested before a mock tollgate panel
- Replace opinion-led decisions in your projects with statistical evidence sponsors can check
- Keep improvements in place after handover through control charts and clear response plans
- Work through real datasets with managers running projects in service, manufacturing and public settings

Conclusion

A process improvement project earns support when its problem is defined precisely, its causes are proven with data and its gains are held after handover. This course moves from project selection and chartering, through measurement, capability and statistical root cause analysis, to experimentation, risk analysis and statistical control. The final day applies each tool to working datasets and assembles a DMAIC Project Storyboard for every participant, so that Core Concept participants return ready to take a live project through its next tollgate.