Statistical Process Control (SPC) Training Programme

Using data to control processes, reduce variation, and improve quality

Introduction

In manufacturing and service operations, many quality problems are not caused by equipment failure or operator error, but by uncontrolled process variation. Without a structured method to monitor and analyse process behaviour, organisations often rely on inspection, rework, and corrective actions that increase cost and reduce efficiency.

Statistical Process Control (SPC) is a proven, data-driven approach that enables organisations to understand process performance, distinguish between normal and abnormal variation, and take timely corrective actions before defects occur. This SPC Training Programme is designed to provide participants with practical knowledge and hands-on skills to apply SPC tools effectively in real production and operational environments.

Program Objectives

The programme aims to:

1. Develop a clear understanding of process variation and statistical thinking
2. Equip participants with practical skills to apply SPC tools and control charts
3. Improve process stability, consistency, and predictability
4. Reduce defects, rework, and waste through early detection of process issues
5. Support continuous improvement and data-based decision-making

Learning Outcomes

Upon completion of the programme, participants will be able to:

1. Explain the concept of variation and its impact on process performance
2. Select and construct appropriate SPC control charts
3. Interpret control chart signals and identify out-of-control conditions
4. Calculate and interpret basic process capability indices
5. Apply SPC findings to improve and sustain process performance

Who Should Attend

This programme is suitable for:

1. Quality engineers, quality inspectors, and quality managers

2. Manufacturing and process engineers
3. Production supervisors and team leaders
4. Continuous improvement and operational excellence personnel
5. Technicians and operators involved in process monitoring

Methodology

The programme adopts a practical and application-focused approach to ensure effective learning.

1. Classroom sessions to explain SPC concepts and statistical fundamentals
2. Step-by-step demonstrations of control chart construction and analysis
3. Hands-on exercises using real or simulated process data
4. Case discussions based on manufacturing and operational scenarios

Program Outline

Day 1

Module 1: Introduction to Statistical Process Control and Quality Thinking

This module establishes the foundation of SPC by explaining its role in modern quality management. Participants learn why reliance on final inspection leads to higher cost and unstable quality, and how SPC shifts the focus toward prevention and early detection. The session links SPC to operational performance, customer satisfaction, and continuous improvement initiatives.

Module 2: Understanding Process Variation and Process Behaviour

Participants explore the nature of variation in processes and how it affects consistency and output quality. The module explains the difference between inherent process variation and abnormal variation, using practical production examples. Emphasis is placed on understanding process behaviour before attempting corrective actions.

Module 3: Data Types, Measurement Systems, and Data Collection

This module focuses on preparing reliable data for SPC analysis. Participants learn the differences between variable and attribute data, appropriate sampling techniques, and basic considerations for data accuracy and consistency. The

importance of proper measurement and data discipline in SPC implementation is highlighted.

Module 4: Control Charts for Variable Data

Participants are guided through the use of control charts for continuous data. The module explains when and how to use charts such as X-bar, R, and Individual–Moving Range charts. Step-by-step guidance is provided on establishing control limits, plotting data, and understanding chart behaviour in real processes.\

Day 2

Module 5: Control Charts for Attribute Data

This module addresses control charts used for defect counts and defect rates. Participants learn how to select suitable charts based on process output, interpret patterns, and understand the limitations of attribute data compared to variable data. Practical examples help connect charts to everyday quality issues.

Module 6: Interpretation of Control Charts and Decision Making

Participants learn how to interpret control chart signals, trends, runs, and patterns that indicate loss of process control. The module emphasises correct decision-making, including when to investigate root causes, when to take corrective action, and when not to tamper with stable processes.

Module 7: Process Capability and Performance Analysis

This module introduces process capability concepts and their relationship to customer specifications. Participants learn how capability indices are used to assess whether a process can consistently meet requirements. The session clarifies the difference between process stability and process capability and how both are required for effective quality control.

Module 8: Integrating SPC into Daily Operations and Improvement

The final module focuses on sustaining SPC in real operational environments. Participants learn how to embed SPC into daily monitoring, standard work, and problem-solving routines. The module also covers common implementation challenges, roles and responsibilities, and how SPC supports long-term process improvement rather than short-term firefighting.