Southwest Center for Microsystems Education (SCME)
University of New Mexico

Statistical Process Control (SPC) Learning Module

This learning module contains:
Learning Module Map
Knowledge Probe (Pre-test)
Introduction to Statistical Process Control (Primary Knowledge)
Control Chart Basics (Primary Knowledge)
Activity – Apply SPC to Resistance Measurements
Activity (Advanced) – MEMS Process Problem
Final Assessment (2 – multiple choice and short answer)

A Learning Module Map is included as a suggested outline for this module.

Statistical Process Control or SPC is a set of tools used for continuous improvement and the assurance of quality in an active manufacturing process. This learning module introduces some of the SPC tools used by technicians and engineers, including one of the most common tools - control charts. Activities provide the opportunity to demonstrate an understanding of control charts using select sets of data.

Target audiences: High School, Community College, University,
Industry Technicians

Learning Module Map for Statistical Process Control (SPC) Overview

Statistical Process Control (SPC) is a set of tools used for continuous improvement and the assurance of quality in an active manufacturing process. This learning module introduces some of the SPC tools used by technicians and engineers, including one of the most common tools – control. Activities provide the opportunity to demonstrate an understanding of control charts using select sets of data.

Learning Module units:

- Knowledge Probe (KP)
- Introduction to Statistical Process Control Primary Knowledge (PK)
- Control Chart Basics PK
- Activity – SPC Resistance Activity
- Advanced Activity – Troubleshooting a MEMS Process Problem (Activity can be found in the SCME Systematic Approach to Problem Solving Learning Module)
- Final Assessments

IMPORTANT STEPS	KEY POINTS	REASONS
Pre-test (Knowledge Probe)	Have the participants complete the Knowledge Probe.	Determine the participants' current knowledge of etch processes prior to starting the learning module. Compare the outcome of the KP against the final assessment to determine the effectiveness of this learning module.
Introduction to Statistical Process Control (SPC) PK	Present this material to the class or have the students study this material before coming to class.	An introduction to SPC – its purpose, objectives, applications in manufacturing, and common tools used.

<u>Control Charts Basics PK</u>	Present this material to the class or have the students study this material before coming to class.	An introduction control charts, - types of charts, how they are used, where they are used, how they are developed, setup and interpreted.
<u>Activity 1:</u> SPC Resistance Activity	This a activity has the students collect data, develop a control chart using that data, and use the control chart using additional data.	Provides participants with the opportunity to use real data in the development and interpretation of control charts.
<u>Activity 2:</u> MEMS Process Problem (Activity found in the "Systematic Approach to Problem Solving Learning Module)	For a more advanced application of SPC and an application that uses a real time problem that could occur during the fabrication of MEMS, take the students through the Problem Solving Learning Module.	This activity uses SPC and a systematic approach to problem solving to solve a MEMS Process Problem in in the photolithography process.
<u>Assessment:</u> Complete the Final Assessment.	Give the participants one of the final assessments. Two are provided. One is strictly multiple short and one a short answer assessment.	Compare the results of this assessment with the results of the KP to determine the effectiveness of this learning module in teaching the etch process.

Adapted from Graupp, P. & Wrona, R. (2006) The TWI Workbook: Essential Skills for Supervisors. New York, NY. Productivity Press.