

SEMBIT3-22 - SQA Unit Code F9J9 04

Carrying out statistical process control (SPC) procedures



Overview

This unit covers the competences required for carrying out statistical process control (SPC) procedures. It involves applying the principles and processes of SPC to a selected process, and gathers all the necessary data for analysis, in consultation with relevant people. You will be expected to apply statistical process control, utilising statistical and graphical methods to represent the process conditions. Typically, these would focus on simple run charts, tally charts, bar charts, histograms, run charts, box plots time series charts, Pareto diagrams and stem and leaf plots.

You will need to perform basic statistical process control, identifying special cause versus common cause. You will also be expected to identify activities which will improve the process performance, and to produce an action plan to implement the improvements. Calculation of the capability of the process will focus on identifying C_p and C_{pk} .

Your responsibilities will require you to comply with organisational policy and procedures for the activities undertaken, and to report any problems that you cannot solve, or that are outside your responsibility, to the relevant authority. You will be expected to take full responsibility for your own actions within the activity, and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to the techniques and procedures used. You will need to understand the principles and procedures of statistical process control, and its application, in adequate depth to provide a sound basis for carrying out the activities to the required criteria.

Applying safe working practices will be a key issue throughout.

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Performance criteria

You must be able to:

- P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines
- P2 work to, and comply with all the required process monitoring documentation and work instruction sheets
- P3 select and/or confirm the process on which the process analysis is to be carried out
- P4 consult with relevant people and gather all the necessary data for analysis
- P5 apply the principles and processes of statistical process control to the chosen process
- P6 utilise statistical and graphical methods to represent the process conditions
- P7 identify activities which will improve the process performance
- P8 contribute to the production of an action plan to implement the improvements

Knowledge and understanding

You need to know and understand:

- K1 the health and safety requirements of the area in which you are carrying out the process control activities
- K2 where process control fits within a continuous improvement environment
- K3 how process performance affects customer satisfaction and process costs
- K4 where and why statistical process control is used, the benefits, and how it is applied
- K5 the importance of standardisation within a process operation, and why process performance can only be determined when it is controlled
- K6 how process control can improve process performance
- K7 the benefits of prevention and detection
- K8 the two types of variation within a process (common cause, special cause), and the impact they have within the process
- K9 how to gather data and effectively analyse it; how the data can be used to communicate abnormalities within a process
- K10 the main types of control charts used for SPC, their features and benefits, and how to construct and implement them
- K11 the meaning of a 'population' and a 'sample'
- K12 the measurements of central tendency and variability, and how they are calculated
- K13 the properties of a normal curve of distribution
- K14 how to create charts or diagrams (such as run charts, histograms, box plots, time series charts, Pareto diagrams, and stem and leaf plots)
- K15 how to explain the terms and calculate mean, median, mode, standard deviation, range and variance
- K16 how to explain and calculate process capability (Cp and Cpk)
- K17 the extent of your own authority, and to whom you should report in the event of problems that you cannot resolve

Additional Information

**Scope/range
related to
performance
criteria**

You must be able to:

1. perform basic statistical process control, using appropriate tools and techniques
2. calculate the capability of the process, identifying:
 - 2.1. Cp
 - 2.2. Cpk
3. produce charts for process and control information, to include **three** from:
 - 3.1. simple run charts
 - 3.2. tally charts
 - 3.3. bar charts
 - 3.4. histograms
 - 3.5. box plots
 - 3.6. time series charts
 - 3.7. Pareto diagrams
 - 3.8. stem and leaf plots
 - 3.9. run charts

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