

### Overview

This unit covers the competences required for producing multi-variance charts. It involves selecting a suitable activity on which to carry out the multi-variance charting process, consulting with the appropriate people and gathering the relevant data necessary for the analysis. You will be required to use the data collected to produce a data demographics form for the process and, subsequently, a multi-variance chart showing within part variation, piece-to-piece variation and time-to-time variation. You will need to record and display the information as bar charts, histograms, Pareto diagrams, stem and leaf diagrams, box plots and time series charts. You will also be expected to produce a report of the activity highlighting the opportunities for improvement and an action plan, which makes recommendations of how they can be implemented.

Your responsibilities will require you to comply with organisational policy and procedures for the activities undertaken, and to report any problems with the activities that you cannot solve, or that are outside your responsibility, to the relevant authority. You will need to ensure that all the necessary documentation and/or visual representation is completed accurately and legibly. You will also be expected to take full responsibility for your own actions within the activity, and for the quality and accuracy of the work that you produce.

Your underpinning knowledge will provide a good understanding of multi-variance charts, and will provide an informed approach to the techniques and procedures used. You will need to understand the principles and application of multi-variance charting, 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.

### 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 select a suitable activity on which to carry out the multi-variance charting process
- P3 consult with the appropriate people and gather the relevant data necessary for the multi-variance charting analysis
- P4 produce a data demographics form for the selected activity
- P5 produce a multi-variance chart on the activity selected
- P6 identify opportunities for improvement from the multi-variance chart
- P7 create an action plan that minimises variation, and make recommendations of how the improvements can be implemented

### Knowledge and understanding

*You need to know and understand:*

- K1 the health and safety requirements of the area in which you are gathering the data for a multi-variance chart activity
- K2 why we need to carry out multi-variance charting, and the benefits to be gained from this activity
- K3 how to construct a data demographics form and a multi-variance chart
- K4 how to assess the chart for within-piece variation, piece-to-piece variation and time-to-time variation
- K5 the amount of data required to draw statistically valid conclusions from the chart
- K6 how to draw further conclusions (by utilising such tools as bar charts, box plots, histograms, stem and leaf diagrams, Pareto diagrams and time series charts)
- K7 the benefits of multi-variance analysis with respect to design of experiments (DOE)
- K8 the extent of your own authority within the project, 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. use the data demographics form to produce a multi-variance chart, showing:
  - 1.1. within-part variation
  - 1.2. piece-to-piece variation
  - 1.3. time-to-time variation
2. record the collected data, utilising at least **three** of the following techniques:
  - 2.1. bar charts
  - 2.2. histograms
  - 2.3. Pareto diagrams
  - 2.4. stem and leaf diagrams
  - 2.5. box plots
  - 2.6. time series charts
3. produce multi-variance charts for **two** of the following:
  - 3.1. concept
  - 3.2. product
  - 3.3. design
  - 3.4. process
  - 3.5. system
  - 3.6. machine

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### Producing multi-variance charts

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