Overview

This unit covers the competences required for carrying out measurement systems analysis (MSA). It involves selecting an appropriate measurement system on which to carry out the analysis, and obtaining all the necessary data in order to carry out the measurement systems analysis. You will be expected to apply the principles and processes of measurement system analysis, which will include such things as completing a calibration study on a gauge, conducting a gauge linearity study, completing either an attribute or a variable gauge repeatability and reproducibility study, conducting a metrology study on a measurement system which includes either a variable or attribute gauge repeatability and reproducibility study.

You will be required to carry out the analysis using the appropriate techniques, and to record the results of the analysis in the appropriate format. From this information, you will need to determine the percentage gauge repeatability and reproducibility of the measurement system under study, and to produce a detail report suggesting ways in which the measurement system might be improved.

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 is completed accurately and legibly. 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 produce.

Your underpinning knowledge will provide a good understanding of measurement systems analysis, and will provide an informed approach to the techniques and procedures used. You will need to understand the principles and application of MSA, 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 an appropriate measurement system on which to carry out the analysis
P3  obtain all the necessary data in order to carry out the measurement systems analysis
P4  carry out the analysis, using the appropriate techniques
P5  record the results of the analysis in the appropriate format
P6  determine the percentage gauge repeatability and reproducibility of the measurement system under study, and suggest ways of improving the measurement system
P7  produce a measurement systems analysis report, detailing ways of improving the measurement system under study
Carrying out measurement systems analysis (MSA)

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 measurement systems analysis
K2  why we should study our measurement systems
K3  how to select a measurement system for analysis
K4  the possible sources of measurement systems variation
K5  the use of measurement systems analysis, and how it can be used in a Six Sigma improvement project
K6  how to conduct a variable and a attribute repeatability and reproducibility study
K7  the terminology used in measurement system analysis (such as bias, linearity, stability, accuracy, repeatability, discrimination, resolution, reproducibility)
K8  how to conduct a measurement systems analysis study
K9  how to calculate gauge repeatability and reproducibility
K10 how to calculate gauge precision and tolerance
K11 industry rules for repeatability and reproducibility results
K12 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. carry out a measurement system analysis, which includes **three** from the following:
   1.1. completing a calibration study on a gauge
   1.2. conducting a gauge linearity study
   1.3. completing either an attribute or a variable gauge repeatability and reproducibility study
   1.4. conducting a metrology study on a measurement system which includes either a variable or attribute gauge repeatability and reproducibility study

2. determine the type of measurement system variation, to include **two** of the following:
   2.1. bias
   2.2. linearity
   2.3. stability
   2.4. accuracy
   2.5. repeatability
   2.6. reproducibility
Developed by | SEMTA
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Version number | 1
Date approved | December 2008
Indicative review date | December 2013
Validity | Current
Status | Original
Originating organisation | SEMTA
Original URN | 25
Relevant occupations | Business, Administration and Law; Associate Professionals and Technical Occupations; Business management; Business and Finance Associate Professionals
Suite | Business Improvement Techniques Suite 3 2008
Key words | Engineering, business, improvement, techniques, measurement systems analysis, MSA, repeatability, reproducibility