

MEASUREMENT SYSTEM ASSESSMENT (MSA)



Introduction

Organisation always overlooks the impact of not having capable measurement systems. Good parts are wrongly rejected, and bad parts are mistakenly accepted, or a satisfactory process appears unsatisfactory.

A capable measurement system will enhance the effectiveness and efficiency in implementing any process control programme and improvement initiatives because the actual variables of interest now lies directly with the processes itself.

Objectives

This course will enable the participants to:

- Understand the fundamental principle of measurement system and its effect and impact on the quality of measurement data and the accuracy of the process analysis.
- Interpret the types of variations influencing the measurement system performance.
- Conduct Variable and Attribute Measurement System Studies.
- Acquire the use of statistical techniques to evaluate the measurement system in terms of GR&R % and ndc (Number of Distinct Categories).
- Appreciate the use of available software to compute the result of Measurement System Studies.

Duration

2 days | 9am – 5pm | 14 hours

Who should attend

This course is particularly suitable for and benefit to Engineers, Supervisors, Process Specialists or any personnel involve in quality assurance, process control and improvement activities.

Course Fees

Member: S\$535.00

Non-Member: S\$588.50

Registration Fee of S\$17.12 apply

SDF funding & SkillsFuture applicable

All fees stated are inclusive of 7% GST

Award of Certificate

Certificate of Completion will be issued to participants who have attended at least 75% of the course.



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Course Contents

- 1 Main Concept of Measurement System**
 - 1.1 Introduction, Purpose and Terminology
 - 1.2 Quality of Measurement Data
 - 1.3 The Measurement Process
 - 1.4 Statistical Properties of Measurement Systems
 - 1.5 Standards: Background and Use of Standards
 - 1.6 Purpose of Calibration & Calibration Systems
- 2 Types of Measurement System Variation**
 - 2.1 Source of Variations
 - 2.2 Bias
 - 2.3 Repeatability
 - 2.4 Reproducibility
 - 2.5 Stability
 - 2.6 Linearity
- 3 Computation Techniques Associated with GR&R**
- 4 Analysis of A Measurement System**
 - 4.1 Measurement System Discrimination
 - 4.2 Process Variation – Location
 - 4.3 Process Variation – Width or Spread
 - 4.4 Analysis of Measurement System's Variability using Work Examples: Bias / Repeatability / Reproducibility / Stability / Linearity
- 5 Effects of Measurement System Variability**
 - 5.1 Effect on Decisions
 - 5.2 Effect on Product Decisions
 - 5.3 Effect on Process Decisions
 - 5.4 New Product Acceptance
 - 5.5 New Process Acceptance
 - 5.6 Process setup and control
 - 5.7 Effectiveness in establishing QC / QA Systems
- 6 Assessing Measurement Systems**
 - 6.1 Background : Measurement System Overview
 - 6.2 Selecting and Developing Test Procedures
 - 6.3 Preparation for a Measurement System Study
- 7 Variable Measurement System Study**
 - 7.1 Range Method (Rapid Approximation)
 - 7.2 Average and Range Method (XBar-R)
 - 7.3 Standard GR&R Study
 - 7.4 Analysis of Variance (ANOVA) Method
 - 7.5 Application of ANOVA using Computerised Software (e.g Minitab)
 - 7.6 Interpretation of ANOVA Result & Number of Distinct Categories
- 8 Attribute Measurement System Study**
 - 8.1 Attribute Gage Study (Go/No Go Method)
 - 8.2 Visual Standard: Based on Percentage of Correct Decision
 - 8.3 Visual Standard: Based on "Inter-raters Agreement" In Terms of Cohen's Kappa Value
- 9 Method for Reducing Unacceptable GR&R Result**
- 10 Application of Calibration Techniques In Measurement System**
 - 10.1 Measurement Error vs Measurement Uncertainty
 - 10.2 Calibration System / Measurement Traceability
 - 10.3 Major Categories of Calibration
 - 10.4 Review and Discuss Certificate of Calibration
 - 10.5 Determination of Calibration Interval
- 11 Impact of GR&R on Process Capability Studies**
 - 11.1 Interpretation & Application of Process Capability Studies
 - 11.2 Computation of Estimated Process Standard Deviation
 - 11.3 Calculation of Process Capability Index
- 12 Class-room Assignment and Exercises**

Case Study: Impact of GR&R on Process Capability Studies



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Membership Categories:
 ~ Organisation membership
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