

## Understanding Core Tools: Measurement System Analysis (MSA)



**Course Duration: 1 Day - 8 Hours/day**

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## Seminar Content

This one-day overview is designed to provide participants with an understanding of the importance of MSA in controlling and improving the production process and to give students a practical knowledge of using statistical methods in analyzing the measurement system.

The approaches discussed and employed in this course are consistent with the intent and guidelines in the MSA 4th Edition Reference Manual issued by GM, Ford and FCA through the AIAG.

## Learning Objectives

- ❖ Explain bias, linearity, stability, repeatability and reproducibility
- ❖ Identify the type of MSA study that is appropriate for the situations
- ❖ Explain discrimination and number of distinct categories
- ❖ Identify all important aspects of setting up a study
- ❖ Explain the acceptance criteria for gage R&R studies

## Seminar Outline

- ❖ What is a Measurement System?
- ❖ Foundations of Measurement Systems Analysis
- ❖ Effects of Variation on Process Decisions
- ❖ Statistical Properties of Measurement Systems
- ❖ The Statistical Properties of Measurement Systems
- ❖ Sources of Variability
- ❖ Effects of Variation on Capability Indices

- ❖ Discrimination & Uncertainty
- ❖ Understanding Discrimination and its Effects
- ❖ Understanding Uncertainty
- ❖ Bias, Linearity and Stability
- ❖ Define Reference Value
- ❖ Describe and Analyze Bias
- ❖ Breakout Exercise 1: Calculating Bias
- ❖ Describe and Analyze Uncertainty
- ❖ Breakout Exercise 2: Bias & Linearity
- ❖ Describe and Analyze Stability
- ❖ Breakout Exercise 3: Stability
- ❖ GRR Studies
- ❖ Define GRR
- ❖ Describe and Analyze GRR (Repeatability and Reproducibility)
- ❖ Breakout Exercise 4: Graphing GR&R
- ❖ Breakout Exercise 5: Calculating GR&R
- ❖ Describe Acceptance Guidelines for GRR and ndc

## Who Should Attend

This seminar is designed for Quality Managers, Quality System and Lab Technicians, Management Representatives, Internal Auditors who audit MSA, persons responsible for planning, using and maintaining measurement systems, and engineers and individuals responsible for process improvement.

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## Seminar Materials

Each participant will receive a seminar manual and a workbook including all team breakout exercises.

## Pre-Requisite

Participants should possess basic math skills.

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