



## CQE Training & Consultancy Plt (Reg. No. : LLP 0003668 LGN)

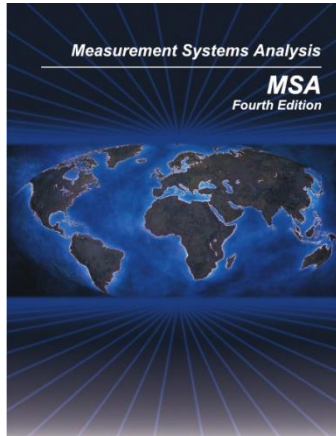
Registered Office : No. 46, Lorong Bintang, Taman Tasik Permai, 34000 Taiping, Perak. Malaysia.

Operating Office : No. 85A (1<sup>st</sup>. Floor), Jalan Barrack, 34000 Taiping, Perak. Malaysia.

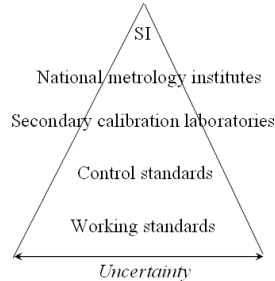
T : +605-805 2722 F : +605-805 2721 M : +6012-505 2720 / +6012-502 2720

E : [cqetraining@gmail.com](mailto:cqetraining@gmail.com) or [kuangkh@cqetraining.com](mailto:kuangkh@cqetraining.com) W : <http://www.cqetraining.com> B : <http://cqeblog.blogspot.com>

# MEASUREMENT SYSTEM ANALYSIS (MSA) (PUBLIC/IN-HOUSE TRAINING PROGRAMME)



### Metrological traceability



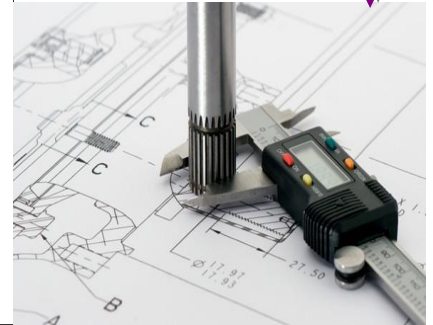
- Calibration gives trueness!



SP Technical Research Institute of Sweden

A.6.10.14 Measurement quality

© Leslie Pentill 091008



SBL  
Scheme

## INTRODUCTION

This course addresses the formal requirements and establishment, control and maintenance of metrology, measurement and calibration systems to meet the requirements of the ISO9001:2015 and IATF16949:2016 standards including the Quality Assurance Requirements for Measuring Equipment of the ISO10012:2003 and NIST, USA. In this highly interactive session, there would be a balance of lectures, workshops and exercises.

## LEARNING OUTCOMES/OBJECTIVES

Upon return to workplace, participants will be able to :

- Appraise the company's measurement & calibration systems ;
- Develop an in-house cost effective measurement & calibration programme ;
- Statistically extend or reduce calibration frequencies of equipment to maximize programme effectiveness ;
- Fulfilling all requirements of ISO9001:2015 and/or IATF16949:2016 standards especially on the part of Gage Repeatability & Reproducibility Study (GR&R)
- Initiating measurement & calibration cost down programmes.

Using MINITAB  
and MS Excel



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# CONTENTS

**Also available as  
in-house programme**

## DAY 1

### ● **Measurement Concepts and Systems**

- ✚ Introduction to Metrology
  - Purpose and terminology
  - Statistical properties of measurement systems
  - Standards
  - General guidelines
  - Selecting / developing test procedures
  - Procedures for assessing measurement system
    - \* Measurement issues
    - \* Types of measurement system variation – Bias, Repeatability, Reproducibility, Stability and Linearity
- ✚ Types of Measurements
- ✚ Measurement Standards
- ✚ Exercise

### ● **The Requirements of ISO 9001:2015 and IATF16949:2016 Series**

### ● **The Differences between AIAG MSA Manual 3<sup>rd</sup> Edition and 4<sup>th</sup>. Edition**

### ● **The Quality Assurance Requirements of the ISO10012:2003 and NIST**

- **Measurement Management Systems – Requirements for Measurement Processes and Measuring Equipment**

## DAY 2

### ● **Determination of Measurement Errors**

- ✚ Measurement Uncertainty
- ✚ Measurement Tolerance
- ✚ Permissible Error
- ✚ Confidence in Measurement
- ✚ Exercise



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### ● **Measurement Operating Procedures**

- ✚ Development of Measurement & Calibration Systems
- ✚ Development of Working Procedures including Traceability Chain
- ✚ Management and Maintenance of Measurement & Calibration Systems
- ✚ Cost Improvement Techniques / Programmes
- ✚ Group Discussion

### ● **Gage Repeatability & Reproducibility (GR&R)**

- ✚ Introduction & its purpose
- ✚ Short Method
- ✚ Exercise #1
- ✚ Long Method
- ✚ Exercise #2

### ● **Case Study & Exercises**

- ✚ Concepts
- ✚ Practices

## **TRAINING METHODOLOGY**

The program would be conducted by using the following materials / aids:-

- ✚ Course Note
- ✚ LCD / OHP
- ✚ Group Activities / Workshop
- ✚ Lecturettes
- ✚ Computer software such as MS Excel and/or MINITAB usage and application.

## **DURATION**

2 Days

## **PARTICIPANTS**

This programme is designed for all levels of management and employees who are involved in Inspection, Measuring and Testing activities.



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