Operational excellence

Measurement Systems Analysis (MSA, Gauge R&R)

One day to find out whether your measurements are reliable enough to accept a part, adjust a machine or calculate a capability. Participants run a gauge R&R study on an instrument at your site, analyse bias, linearity and stability, and handle visual inspections and go / no-go gauges with an attribute study. They leave with an MSA study plan for their critical inspection equipment.

Duration : 1 day

Objectives

1. Explain the components of measurement error: bias, linearity, stability, repeatability, reproducibility
2. Prepare a gauge R&R study: choice of parts and operators, number of trials, blind measurements
3. Calculate and interpret a gauge R&R study with the average and range method, and read an ANOVA result
4. Run an attribute study for a visual inspection or a go / no-go gauge
5. Decide what follows a study: accept the equipment, improve it, train operators or change the method

Programme

Day 1 — morning

• Why analyse the measurement system: an unreliable measurement distorts sorting, SPC and capability

• The measurement system: instrument, operator, method, part, environment

• Bias, linearity, stability: definitions and simple studies

• Repeatability and reproducibility: principle, study design, practical precautions

Day 1 — afternoon (workshop)

• Calculating a gauge R&R study: share of total variation, number of distinct categories, acceptance criteria

• Attribute studies: agreement of each operator with themselves, with the others and with the reference

• Workshop: a gauge R&R study run in the session on a measuring device at your site, then analysis of the results

• Calibration and verification of instruments: what they cover and what only the MSA study reveals

• Knowledge test and study plan for critical equipment

Teaching methods

• Real measurements in the session with your instruments and your parts

• Calculations on a supplied spreadsheet, then reading a report from statistical software

• Attribute study on parts or samples from your production whose defects are known

• Comparing results between participants to make reproducibility visible

Assessment and documents

Knowledge test and end-of-course evaluation at D+1; the gauge R&R study run in the workshop serves as an assessed practical exercise. Numbered training certificate, verifiable online, for each participant; training report and MSA study plan handed to the company.

Bilingual materials for every participant; each classroom course comes with its digital twin on OmniLearn.

Good to know

The course « Metrology and Instruments » covers calibration and management of the instrument fleet, a natural complement to the MSA study. « Statistical Process Control (SPC) » then relies on validated measurements.

Practical information

Duration	1 day
Audience	Quality technicians and engineers, metrologists, inspection laboratory, methods
Prerequisites	Ability to use a spreadsheet; basic statistics are useful
Group size	Groups of 6 to 12 participants, in-company
Format	In-company, face to face on your site
Language	French, Darija or English; bilingual materials
Funding	OFPPT special training contracts (TFP), GIAC, Maroc PME: we prepare the applications with you, at no extra cost.
Programme customisation	Programme adapted to your procedures, your equipment and your audience

Frequently asked questions

What is the difference between calibration and MSA?

Calibration compares the instrument with a reference under controlled conditions. An MSA study evaluates the whole measurement system as it is used in production, with your operators, your parts and your method. A well-calibrated instrument can still give a measurement that is unusable at the workstation.

Which equipment should we study first?

Equipment used to accept or reject a product, to adjust a process or to monitor a characteristic that matters to the customer or to regulations. The workshop helps you rank your equipment and plan the studies.

Can an MSA study be run on a visual inspection?

Yes, with an attribute study: several operators assess the same set of samples several times, with the status known. Their agreement with each other and with the reference is measured.

Do we need statistical software?

No. The calculations are done in a spreadsheet during the course. If your site has statistical software, we show how to read its results and check its settings.