

CRAFTSMAN'S CRIBSHEET

NUMBER
35

Monte Guitar – Director of Technical Programs

Technical

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Management

A Gage R&R Approach

An improperly defined gage repeatability and reproducibility (R&R) program can drain a company of resources and reduce the effectiveness of the shop. ISO/TS16949:2009 states that variation studies, "shall apply to measurement systems referenced in the control plan." The purpose of analyzing your measurement system is to understand the sources of variation that can influence the results produced by the system. Here is a suggested approach to applying logic to this requirement.

Measurement Techniques: Any one of three systems to check product status, product characteristics or process equipment. The types of measurement techniques used within the organization include measurement systems, inspection systems and test systems.

1. Measurement System

A precision measurement technique used to check product characteristics. Statistical studies are appropriate, because an operator could alter the reading of the equipment with an improper method. Examples of measurement systems include micrometers and hardness testing machines.

2. Inspection System

A non-precision measurement technique. Tolerances are large enough to minimize the consequences of operator error. Instrumentation classified as an inspection system does not lend itself to measurement system analysis studies. Examples of inspection systems include visual, ruler and tape measure.

3. Test System

A precision measurement technique used to generate a reading that prompts a pass or fail decision. Instrumentation classified as a test system does not lend itself to measurement system analysis studies. Test system techniques are used predominantly in checking the equipment that supports the process (pyrometer, PSI gage, UV light meter).

The standard's "each type" requirement does not mean that each and every micrometer must have evidence of an R&R associated with it. The analysis of each type of gage can be done by selecting a representation of both gages and operators. A 100 percent R&R inspection for each gage would provide no additional value. It is the system that is being measured, not the individual gages. Any competent auditor would understand that a massive R&R production process based on 100 percent inspection would add no more value and would be statistically irrelevant.

Examine your control plan and locate the space where you are to identify the measurement system utilized. The "Evaluation Measurement Technique" is the column within the control plan that references the statistical studies requirement. The statistical studies should be performed only on those devices classified as measurement systems as defined above.

By properly designating the types of systems you use in your shop, you can avoid the need for irrelevant and redundant gage studies that add no value. You will be justified in limiting your statistical studies to those measurement systems cited in your control plan.

