

Traceability and Uncertainty: What are they? And why do we need them?

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Abstract

Traceability and uncertainty are two terms that are often encountered when discussing and describing measurements and metrology. But what do these terms actually mean, and, why are they important? This talk provides answers to these two questions. The talk begins by exploring the origins of traceability from the early days of commercial trading, and how traceability has evolved to enable trading to be achieved on a global scale. At the same time, an equivalent need for traceability in science, engineering and technology is described and how this has led to the development of a quantum-based international system of units. The talk also explores the meaning of the term uncertainty, as applied to measurements. It does this by demonstrating that uncertainty is an integral part of all measurement results. In fact, a more general way to understand and interpret a measurement result is by way of a probability distribution describing the overall state of knowledge concerning the measurand – i.e. the quantity being measured. The uncertainty is then used to help summarise the information contained in the probability distribution.

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