

Forensic metrology: how measurement can help justice
by
Veronica Scotti and Alessandro Ferrero

This tutorial covers this new branch of metrology from the perspective of law professionals. Its aim is to show how the correct expression of measurement results, together with their uncertainty, can help the trier of fact to issue its sentence, especially when the solution of the case involves exclusively (or almost exclusively) technical or scientific issues.

A brief survey of the elementary background of the two most widespread law systems – common law and civil law – is given, to analyze similarities and differences and show when and how experimental tests can be requested by investigators and judges to help reconstructing a criminal event.

A brief survey is also given of the uncertainty concept and how uncertainty should be presented and used when a measurement result is employed to assess whether a given threshold has been exceeded or not.

The responsibility of the professional who performs the tests is hence covered, to show how an incorrect or incomplete presentation of the test results might not correctly represent facts to the trier of fact. It is explained why the correct interpretation of measurement activities and results plays an important role in trials, both in common and civil law systems. In fact, despite these two systems are deeply different under most respects, they both follow the universally recognized principle of *ne bis in idem*. This means that nobody can be prosecuted for the same criminal conduct for more than once. The consequences, ethical, social and economical, and not only legal, of an incorrect interpretation of the measurement results can be hence easily understood, since a crime may remain unpunished.