TRENDS AND CHALLENGES OF METROLOGY APPLIED TO CIVIL ENGINEERING RESEARCH

Álvaro Silva Ribeiro
Laboratório Nacional de Engenharia Civil I.P.
Lisboa, Portugal, asribeiro@lnec.pt

João Alves e Sousa
Laboratório Regional de Engenharia Civil I.P. - RAM,
Funchal, Portugal, jasousa@lrec.pt

Luís Filipe Lages Martins
Laboratório Nacional de Engenharia Civil I.P.
Lisboa, Portugal, lfmartins@lnec.pt

ABSTRACT

The development of Civil Engineering research is strongly connected with the development of experimental activity, where measurement has a fundamental role. The need to assure measurement quality is, therefore, a main issue to consider.

The evolution of Metrology from a conventional deterministic approach to a probabilistic approach brought to the top of the metrologists agenda the need to study and provide adequate methods to evaluate quantities estimates and their measurement uncertainties according to this new conceptual approach. This topic affects, in a transverse way, all kinds of measurements and, particularly, those related to Civil Engineering.

Considering the wide nature of phenomena covered by Civil Engineering, the specificity of some measurands and of its traceability and the complex characteristics of some of their functional relations, namely, related to non-linear and dynamic behaviour and to the use of matrix algebra to describe input and output quantities, the experimental activity developed on this domain provides an interesting context to study, develop and apply metrological solutions to different types of problems and to test them for a wider use.

The special interest of the challenges of Metrology applied to Civil Engineering research is related to its strong link to similar problems found in other domains, thus helping Metrology research in its wider sense. The present trends in this research field can be considered as a way to a better understanding of the nature of those problems and to point out solutions increasing the knowledge and opening new perspectives for the incoming years.

KEYWORDS

Metrology, Civil Engineering, Measurement, Uncertainty.