

## **Objective and Scope of TG1.4, 2017 – 2023**

### **Task Group 1.4**

Probabilistic nonlinear finite element modelling, reliability and safety formats in daily engineering practice

#### **Mission Statement & Objectives**

Conventional deterministic methods are not sufficient to adequately design and evaluate new and existing conventional or modern structures and their components, which are exposed to a variety of complex loading conditions from the natural and man-made environment, and to design them sustainably.

In view of uncertainties in loading conditions, material performance, geometric configurations and boundary conditions in daily practice, stochastic analysis techniques (which take all these uncertain aspects into account) are needed for a rational reliability analysis and a realistic description of the existing performance of engineering structures.

Nevertheless, stochastic analysis techniques and their correct application to engineering structures also require a training program/guideline that is transferable and globally recognized, improves the performance of structures and sets standards in the industry.

#### **Scope & Limitations**

TG1.4 focuses on systems, continuum mechanics, engineering structures, static and dynamic aspects, time-dependent aspects, linear and nonlinear material and system aspects, finite element methods (FEM), discrete element methods (DEM) and associated methods, partial safety factor and reliability index/probabilistic based safety formats. TG1.4 does NOT focus on design, systems with large deformations and large non-linear effects, load models, structures made of timber, soil systems.

#### **Project Outputs:**

Round-robin modelling campaign for slender concrete structures to obtain detailed information on deterministic and probabilistic nonlinear finite element effects and to identify and characterize fuzziness and how to deal with it. The list of papers and other outputs produced and published can be found below.

**Start date:** September 2017

**Date of completion:** December 2023

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