JCSS Workshop on Methods for Structural Reliability Analysis

Background
Significant insight and experience has been gained over the last 4-5 decades with respect to the utilization of modern methods of structural reliability. These methods by now comprise important instruments in advanced engineering assessments as well as in the context of developing safety formats for codified design and assessment of structures. Despite these very positive developments, the probabilistic modeling and analysis of structural performances still comprise significant challenges in the area of applied structural reliability analysis.
On the one side, the more wide spread application of modern methods of structural reliability would greatly benefit from a more concise picture with respect to how different classes of practical reliability problems should be modelled and analyzed – and which tools efficiently facilitate this. On the other hand, as the rapid increase of computational capacity opens up the possibilities for more refined probabilistic modeling and assessments, it is – as always – of great interest to take benefit of this increased capacity in the most efficient manner. The recent years of developments of rather specialized probabilistic analysis tools might indeed, individually or in combination, facilitate that important classes of practical reliability analysis problems can be addressed much more efficiently than previously – and we need to explore and understand the potentials for this.

Workshop objective and scope
The present workshop aims to gather experts and professionals actively working on the probabilistic modeling and analysis, in the field of structural and civil engineering, with the purpose of presenting and discussing recent developments in the probabilistic modeling and analysis of structures and civil engineering systems.
In particular the workshop will address mainly two challenges:
- Identification/formulation of different classes of practical reliability problems. I.e. how should the reliability problems be formulated in different cases of practical reliability problems such that they reflect the effects of aleatory and epistemic uncertainties on the structural or systems performances - in the domain of time-space - in consistency with the available knowledge concerning the phenomenological characteristics of the problem. This often results in rather non-trivial probabilistic models involving a mix of non-ergodic random variables with random processes and random fields - with both hierarchically and stochastic dependencies.
- The second challenge concerns the identification of adequate probabilistic analysis techniques and tools which individually or in combinations facilitate the efficient probabilistic analysis of different classes of practical reliability problems. To this end classical bench-mark studies will be of interest, however, much more importantly it needs to be addressed which the underlying assumptions for the adequacy and robustness of the different techniques are – and how these aspects affect their relevance in the context of different classes of practical reliability problems.

Based on the findings and discussions from the workshop it is envisaged that the JCSS will develop and issue a recommendation and guideline on the application of probabilistic modeling and analysis – as an annex to the JCSS Probabilistic Model Code.

Workshop details
The one day workshop will take place at TNO-Delft on January 21, 2019. The workshop will start at 9:00 am and end at 17:00 pm. Abstracts (200 words) and notification of attendance (also in case of no presentation) must be submitted to Michael Havbro Faber (mfn@civil@aau.dk) and Ton Vrouwenvelder (ton.vrouwenvelder@tno.nl) by November 30, 2018. Recent published works will in principle be accepted. Decisions on acceptance of abstracts will be communicated by December 10, 2018.
There will be no costs of participation. Information regarding program, and how to find the venue will be communicated soon after December 10, 2018.
To facilitate sufficient time for discussions we envisage a total maximum of 12-15 presentations – each of around 30 minutes duration. However, attendance and participation in the discussions is encouraged also for attendants without presentations. At the end of the workshop there will also be time for discussions beyond presented material and the JCSS will publish a workshop summary.