VI International Conference on Computational Modeling of Fracture and Failure of Materials and Structures (CFRAC 2019)
12-14 June 2019, Braunschweig, Germany

Dynamic fracture

Joško Ožbolt

Institute of Construction Materials, University of Stuttgart,
70569 Stuttgart (GERMANY) (ozbolt@iwb.uni-stuttgart.de)

Dynamic fracture is an important issue in safety assessment of structures under extreme loading. It is well known that concrete like materials exhibit dynamic response that strongly depends on the loading rate. With increase of the loading rate the resistance is increasing, failure mode is changing and there is a crack branching phenomena. At least that is what we observe in experimental tests. We also know that with increasing loading rate the role of inertia increases at global as well as local (micro) level. It affects the stress distribution and the fracture process. This mini symposium is aimed towards providing fruitful discussions and exchange of ideas and concepts among different approaches used by researches in the fields of experiments, modeling and simulations. The contributions are welcome in order to discuss different views for the same problems.

In the framework of the workshop a number of not yet well understood fundamental questions should be discussed, for example: How does the strain rate influence material properties, strength and fracture energy? What is the reason behind phenomena of crack branching and change of the failure mode? What is the role of inertia? What is the maximum crack velocity in different materials? How the crack propagation influence tensile constitutive law of concrete in case of quasi-static tests? What is the role of moisture and porosity? What is the role of aggregate shape and size? What is the influence of high temperature on the response?.

Furthermore, some technical aspects, experimental and numerical, are of great importance to improve our understanding of different phenomena. For instance: What are the most efficient loading systems for measuring dynamic crack propagation in experiments? How to measure a dynamically progressing of crack and can one observe the initiation of dynamically loaded crack? What are the problems related to the objective evaluation of experimentally measured data? What are reliable numerical models and approaches for simulation of materials and structures under dynamic loading: cohesive crack models, X-FEM, EFG or SPH, deletion of finite elements? Are multi-scale modeling approaches reasonable to be used for modeling of dynamic crack propagations, e.g. is it possible to predict the rate sensitivity coming from micro scale of the material? What are the limits of fragmentation simulations in terms of fragment size and residual velocities? Etc.

All contributions from the experimental, numerical and theoretical fields of research are welcome. Moreover, presentations on industrial real life applications are also of a great interest and are welcome.