Preface

The workshop ‘New Methods of Damage and Failure Analysis of Structural Parts’ provides a forum for experts on structural integrity assessment to meet and discuss new methods of assessing the reliability and safety of structures, ways of extending service lives and analyzing damages in order to apply the newly acquired knowledge in designing new structures. The workshop follows on from seven successful previous workshops held every two years from 2004 to 2016.

This workshop offers an opportunity to share experience new findings related to fracture mechanics, structural design and degradation processes – brittle and ductile fracture, fatigue, creep, corrosion - especially in relation to the direct technical applications of the structural materials used in the damaged components. Several contributions focus on the structural design of engineering parts, an area in which knowledge of damage processes plays an important role in predicting lifespan.

We can currently observe a rapid increase of interest in discussing problems connected with the analysis of damage in structural components by mechanisms of degradation processes. This trend is driven by the increasing cost of raw materials and energy resources, which has created an urgent need to develop methods for extending the service life of structures and increasing their reliability. The importance of topics related to the design of new structures, and the maintenance of their reliability and fitness for service, will continue to grow in the future.

Studying these topics are interdisciplinary tasks. Beside applying perspectives from structural materials and degradation processes, computation of structural stress states, fracture mechanics and fractography, it is also frequently necessary to take into account the technologies used in producing the materials or technological conditions under which the structural were built.

Systems for controlled structural ageing management also form an integral part of new design methods applied to engineering structures, enabling production to be simplified, costs to be reduced, and the durability and reliability of structures to be increased.

The application of research findings is not a short-term solution, and it involves discussions with experts from a range of workplaces. For this reason, the expansion and application of new knowledge concerning degradation processes in structural materials, and the failure of structural components, requires international cooperation. I am confident that this workshop has generated stimulating ideas for the future development of research topics that reflect key priorities for industries.

Prof. Bohumir Strnadel

Editor

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