

INVITED KEY-NOTE PRESENTATIONS

Avoiding Structural Failures in Construction



Predrag Popovich, USA
President of IABSE

Pete Popovic's fields of expertise are the design, assessment and repairs of bridges and buildings. He has in particular expertise in assessment and repair of concrete structures and of fatigue damage in steel bridges, and exterior facades of high-rise buildings. During the first 10 years of practice, he participated in structural design of major steel bridges and rapid transit systems in Chicago, New York and Atlanta, USA. He was engaged in the design of post-tensioned box girder bridges in Kuwait. Over the last 30 years, he has evaluated and designed repairs for over 1500 structures. Major projects included assessment of steel bridges for fatigue damage, investigation of collapses of bridges and buildings, assessment and design of repairs for exterior facades of high-rise buildings up to 60-stories tall, and assessment and repair of over 100 parking structures. Pete act as vice president and senior principal Wiss, Janney, Elstener Associates, Inc., USA.

Bridge Damage Caused by the 2011 Great East Japan Earthquake



Dr. Kazuhiko Kawashima, Japan
Professor, Tokyo Institute of Technology

Prof. Kawashima received his BE, ME and Ph. D in civil engineering from Nagoya University, Japan. After serving for 23 years in the Public Works Research Institute of Japanese Ministry of Construction, he joined the Tokyo Institute of Technology as a Professor of the Department of Civil Engineering in 1995. His research interest is directed to bridge seismic safety including seismic response, ductility capacity of columns and piers, seismic response control, and seismic evaluation and retrofit. He is the receipt of several honors and awards, including the JSCE Tanaka Award, JSCE Yoshida Award and the Minister of Construction's Award for Outstanding Leadership for Technical Development. He authored and co-authored over 400 technical papers on ground motion, structural response, ductility capacity, and passive and semi-active control of bridges. He is a member of the Panel on Wind and Seismic Effects, UJNR, the Science Council of Japan, Japan Association for Earthquake Engineering, Japan Society of Civil Engineers, American Society of Civil Engineers and US Earthquake Engineering Research Institute. He is representative of Japan for International Association for Earthquake Engineering, and currently President, Japan Association for Earthquake Engineering. He is an associate editor of Journal of Earthquake Engineering.

Robustness in Tall Buildings: Earth, Wind & Fire



Dr **Mark O'Connor**, UK
Technical Director, WSP

Mark is the head of advanced structural analysis in WSP's UK structures business. The advanced analysis group are responsible for the more specialist aspects of a building's design such as assessment of static and dynamic structural performance of buildings under extreme events such as wind, earthquake, fire and blast. The group also provide early input into the conceptual design of the lateral stability systems of tall buildings. Since joining WSP in 2004, Mark has successfully led analysis inputs into a variety of tall building designs including the Shard at London Bridge - currently Europe's tallest building. These analyses range from aspects of normal static design to nonlinear structural dynamic modelling. The design of buildings to avoid general progressive collapse and to enhance performance against specific extreme events, such as fire and blast, is a particular speciality. Mark also has extensive seismic design experience through his involvement in many overseas projects and the design of UK nuclear facilities. Prior to working for WSP, Mark had over 18 years experience in consultancy and research & development - applying and calibrating advanced analysis methods against real scale testing of structures and details. This background has been a major cornerstone in giving the confidence that the models developed to represent real structural behaviour adequately capture the detailed structural effects that are so important in ensuring robust structural design.

Failures in Large-Span Roof Structures in Switzerland



Dr René Steiger, Switzerland

Senior Scientist, Swiss Federal Laboratories for Materials Testing and Research (Empa)

René Steiger graduated in civil engineering at the Swiss Federal Institute of Technology (ETH) Zurich in 1986. After receiving his PhD in Technical Sciences from ETH in 1996 he worked as Civil Engineer in an engineering office being responsible for the structural analysis and design of steel, concrete and timber structures as well as for the assessment of existing structures. Since 1999 he has been working as Senior Scientist and Vice Head at the Wood Laboratory of Empa, and since 2012 in Empa's Structural Engineering Research Laboratory. Currently he is managing different research projects, expert's opinions and service contracts in the field of timber engineering. Main research activities he centered on the performance and reliability of timber structures. René has been working in several committees in structural engineering, and authored and co-authored several publications which focused on the assessment of failures and malfunctions of structures, on the general procedure and techniques in assessing timber structures and on the design for robustness.

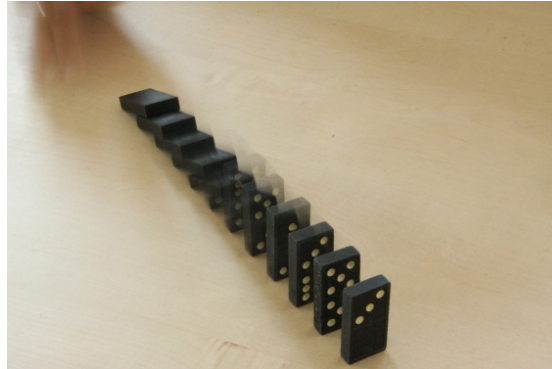
Extending Fatigue Life of Metallic Structures Beyond 100 Years



Dr **Eugen Brühwiler**, Switzerland
Professor, Swiss Federal Institute of Technology (EPFL) Lausanne

Eugen Brühwiler's activities as a Professor of Structural Engineering at the Swiss Federal Institute of Technology (EPFL) in Lausanne, Switzerland, are motivated by the following principle: Methods for the examination of existing structures ("Examineering") must be developed with the ultimate goal to limit construction intervention (and thus the client's expenditure) to a strict minimum. If interventions are necessary then their objective is to improve the structure. His activities as researcher, teacher and consultant include existing civil structures, in particular bridges of high cultural value, fatigue, dynamic and structural behaviour of bridges, as well as Ultra-High Performance Fiber Reinforced Concrete and composite UHPFRC-RC structures for rehabilitation of structures.

Robustness of Structures



Thomas Vogel, Switzerland
Professor, Swiss Federal Institute of Technology (ETH) Zurich

Thomas Vogel graduated as civil engineer from the Swiss Federal Institute of Technology (ETH) Zurich in 1980. He spent more than ten years in consultancy in different parts of Switzerland, designing structures for commercial and industrial buildings, housing as well as bridges. In 1992 he has been appointed Professor of structural engineering at ETH Zurich. His field of teaching and research covers the evaluation of existing structures and non-destructive testing methods, ductile design with brittle materials like concrete, CFRP and glass, as well as structures designed for and protecting from natural hazards. In IABSE he was member of Working Commission 1 (Structural Performance, Safety and Analysis) and chaired it from 2002 to 2005. Since 2005 he has been member of the Administrative Committee. Together with Franz Knoll, Canada he co-authored the Structural Engineering Document (SED) No. 11 "Design for Robustness", which was issued in 2009 and is currently translated into Chinese.

Quantifying redundancy and robustness of structures



Dr. **Joan Casas**, Spain
Professor, Technical University of Catalonia in Barcelona

Joan Casas is professor of bridge engineering at the Technical University of Catalonia in Barcelona. His main fields of expertise are bridge safety and reliability, maintenance and strengthening. Besides his participation in bridge design and construction, Professor Casas has participated in more than 100 consulting and advising works related to bridge safety, maintenance and management and in several European Projects related to safety and robustness of existing bridges and structures. He is author or co-author of 12 books and 8 chapters of books, 83 papers in refereed technical journals and over 200 communications to international scientific meetings. He holds the Bill Curtin Medal 1998, awarded by the Institution of Civil Engineers of United Kingdom to the best paper presented to the Institution describing innovative design in civil engineering and the 2012 IABMAS Senior Prize in recognition of outstanding contributions to the application of advanced bridge inspection, assessment and monitoring techniques.

Structural Failures from Safety Investigation's Point of View



Kai Valonen, Finland

Chief Safety Investigator, Safety Investigation Authority of Finland

Kai Valonen has worked as an accident investigator since 1998. This work has recently been named safety investigation due to the fact that the work is done solely to improve safety. Kai's organisation, Safety Investigation Authority of Finland, investigates accidents in four modes i.e. aviation, railway, marine and the other accidents. Kai has been in charge of the department of other accidents since 2006, but has worked in various cases already before that. Many of the cases have been failures of structures, fires, explosions, industrial accidents, serious road accidents and some special individual cases. The first roof collapse Kai was investigating was a failure of a laminated beam in the roof of a swimming hall in 2000. After that there has been involved in 25 investigations concerning damages of structures. Most of the investigations focus on only one single accident, but some others cover several cases. Kai has graduated from Helsinki University of Technology, Finland.