

GUEST EDITORIAL

Bridge design, maintenance and management

The number of deteriorating bridges is continuously increasing worldwide, with costs of maintenance, repair and rehabilitation greatly exceeding available budgets. A rational and modern approach to bridge management is therefore necessary to maintain or improve safety and serviceability of existing bridges by optimising the available resources under uncertainty and multiple conflicting objectives. The scientific community and bridge engineering profession are responding to this need with the development of advanced methodologies for bridge design and assessment and comprehensive bridge management systems. Following this trend, it was considered appropriate to bring together all of the very best work that has been done in the field of bridge design, maintenance and management at the Fifth International Conference on Bridge Maintenance, Safety and Management (IABMAS 2010), held in Philadelphia, PA, USA, from 11 July 2005 through 15 July 2010 (<http://www.iabmas2010.org>). The First (IABMAS'02), Second (IABMAS'04), Third (IABMAS'06) and Fourth (IABMAS'08) International Conferences on Bridge Maintenance, Safety and Management were held in Barcelona, Spain, 14–17 July 2002, Kyoto, Japan, 18–22 October, 2004, Porto, Portugal, 16–19 July 2006 and Seoul, Korea, 13–17 July 2008, respectively.

The International Association for Bridge Maintenance and Safety (IABMAS, <http://www.iabmas.org>) served as the organising association of IABMAS 2010 in conjunction with Lehigh University's Advanced Technology for Large Structural Systems (ATLSS) Engineering Research Centre. The objective of IABMAS is to promote international cooperation in the fields of bridge maintenance, safety, management, life cycle performance and cost for the purpose of enhancing the welfare of society. The interest of the international bridge community in all these fields has been confirmed by the high response to the IABMAS 2010 call for papers. In fact, 835 abstracts were received by the Conference Secretariat and approximately 70% of them were selected for final publication as full papers and presentation at the Conference within mini-symposia, special sessions and general sessions, for a total of 511 papers scheduled at IABMAS 2010.

The extended versions of eight selected papers presented at IABMAS 2010 are published in this special

issue of *Structure and Infrastructure Engineering*. These papers provide significant contributions to the process of making more rational decisions in bridge design, maintenance and management. The paper by *Buckland* discusses fundamental concepts for the refurbishment or capacity increase of suspension bridges. *Feng* describes the technical progress in the field of bridge engineering in China, including bridge design, construction, maintenance and management, as well as the application of bridge health monitoring technology. *Malerba* gives an overview of studies and rehabilitation works carried out on a group of bridges in the north of Italy belonging to the main bridge types used from 1850 to 1970. *Watanabe et al.* present a survey by the Japanese Society of Steel Construction on longevity of bridges and recent developments on structural health monitoring. *Budelmann et al.* propose a non-destructive measurement tool kit for corrosion monitoring and fracture detection of tendons of prestressed concrete bridges. *Jensen* presents critical aspects related to design, maintenance, rehabilitation and management of several major cable-supported bridges. *Koh et al.* review current practices for lifetime design and address issues to be considered to realise long-span bridges with extended lifetime. Finally, the state of the art in smart wireless sensing and assessment techniques for civil infrastructures is reviewed and three types of smart wireless sensing technologies are discussed by *Yun et al.*, with emphasis on full-scale applications.

The guest editors would like to thank the authors and the reviewers for contributing to this special issue and hope that this collection of papers will represent a useful reference to advance research and applications in the field of bridge design, maintenance and management.

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