Preface

Recent Research Advances on Structural Health Monitoring of Civil Engineering Structures

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Australian Network of Structural Health Monitoring (ANSHM) is the leading professional association in the field of Structural Health Monitoring in Australia. Every year ANSHM organises an annual workshop for members and practicing engineers to exchange their knowledge and practical developments in Structural Health Monitoring (SHM). The annual workshop series have been organized in around Australia either as a standalone workshop or in partnership with other scientific events including international conferences, and several special issues have been published based on these activities and recent research progresses [1, 2].

On 10–12 December 2018, ANSHM embraced its 10th annual workshop hosted by the University of Wollongong. Inspired by high-quality presentations and recent research advances on SHM techniques and applications at the workshop, a special issue was proposed for International Journal of Structural Stability and Dynamics. The 10th ANSHM workshop speakers were invited to submit enhanced and extended versions of their papers to this special issue. After rigorous peer review and revision processes, seventeen full papers and one technical note were accepted for inclusion in this special issue. ANSHM was established in 2009 and the preparation of this special issue also serves as one of the activities celebrating its 10th Anniversary.

The contributions can be broadly classified into data-driven and model-based approaches. In the model-based category, Yang *et al.* and Sadeghi *et al.* proposed two separate model-based methods

for timber heritage buildings and composite structures, while Moravej *et al.* integrated Gaussian process-based finite element model updating and reliability analysis to improve computation. Kalhori *et al.* focused on concurrent identification of impact location and force magnitude of a composite panel, whereas He *et al.* developed a time-domain spectral finite element method for modeling the second harmonic generation of guided waves.

Those data-driven approaches include various interesting global damage assessment methods developed using: two-step drive-by inspection strategy (by Li *et al.*), modal kinetic energy change (Joseph *et al.*), modal flexibility-based deflection changes (Le *et al.*); variational mode decomposition (Xin *et al.*), or frequency response functions in junction with artificial neural networks (Jayasundara *et al.*). In the time series subcategory, Chen *et al.* evaluated two standard deviation parameters of auto-regressive model for non-linear damage identification while Khuc *et al.* developed a method for best-fit non-parametric auto-regressive model for bridge damage identification. Rather than concerning damage, Monavari *et al.* employed an enhanced auto-regressive time series based method for deterioration location of two frames and a concrete box girder.

Not only focusing on global damage identification methods, this special issue also includes new research on ultrasonic based evaluation of prestress force in prestressed concrete bridges (by Hussin *et al.*); non-destructive health evaluation for wood utility poles (Yu *et al.*); modal analysis of monopile and jacket in offshore wind turbines taking into account soil-structure interaction to improve future design (Abdullahi *et al.*), or linear sensor networks with unmanned aerial vehicle for rainfall-induced landslides detection (Yang *et al.*). Apart from seventeen full papers, the special issue also includes one interesting technical note, by Alembagheri *et al.*, on structural identification of elevated steel water tank using ambient vibration tests to calibrate the numerical model. Most studies were verified on real civil structures or large-scale laboratory models, well reflecting the high applicability of the developed methods to solve real-world problems.

As the guest editors of this special issue, we thank the authors for their contribution and all the anonymous reviewers who provided constructive review comments to the manuscripts submitted to this special issue. We would also like to express our sincere gratitude to Professors C. M. Wang, Y. B. Yang and J. N. Reddy, Editors-in-Chief and journal officers Wei Gaik Koid and Yu Shan Tay for their supports and assistances during the entire process.

References:

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