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the sequel

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EDITORIAL

Challenging glass: the sequel

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This year, the recurring Challenging Glass theme yielded an overwhelming number of papers submitted to the related special issue of the Glass Structures & Engineering journal. We therefore decided to split the papers over two special issues and we are delighted to present this sequel to the Challenging Glass issue published earlier this year. The current special issue, which is in fact the third issue published in the UN International Year of Glass, presents a diverse range of challenging topics in the field of glass design, engineering and research.

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The first paper kicks off with a challenging project and presents the hybrid steel and glass structure of the Apple Store at Marina Bay Sands in Singapore. Several engineering challenges that were encountered during the entire process of concept to construction of this highly transparent structure are presented and discussed.

The following set of papers focuses on the challenges related to glass connections. Topics include the numerical prediction of the moisture ingress and related failure of glass-steel adhesive connections; the numerical and analytical investigation of the post-fracture behaviour of a special beam-column connection in a reinforced glass portal frame; and the experimental and numerical investigation of embedded thin metal connections using structural polyvinyl butyral (PVB) for the construction of a frameless glass shell demonstrator.

The next paper continues on the topic of PVB and focuses on the challenge of determining its material characteristics. By making use of special fibre optic sensors, the interlaminar shear modulus of PVB is experimentally determined and evaluated.

The subsequent set of papers investigates the strength of glass. First, the fracture strength of soda-lime-silica glass under challenging temperature conditions up to 275° C is investigated via co-axial double ring experiments. Next, the strength of thin chemically pre-stressed aluminosilicate glass is characterised via a combination of surface stress measurements, depth of

layer measurements, microscopy and strength testing of specimens with and without artificial laser-induced flaws.

The closing set of interrelated papers deepens the knowledge on Closed Cavity Façades (CCF) and deals with the challenges related to the accurate prediction of CCF performance under various loading conditions. Topics include the development of a simple numerical tool for superimposition of climatic load and wind load in CCF; the experimental and numerical assessment of permeability functions in CCF; and the experimental validation of a numerical model for the structural calculation of glass in CCF under dynamic cavity temperature, dry air flow and wind load effects.

We would like to thank the authors for their contributions on these challenges in glass and we trust you will all enjoy reading!