Editorial

Lorenzo Miccoli*, Oliver Kreft and Torsten Schoch

Xella Technologie- und Forschungsgesellschaft mbH,
Department of Applied Research/Building Physics,
Hohes Steinfeld 1, 14797 Kloster Lehnin, Germany
Email: lorenzo.miccoli@xella.com
Email: oliver.kreft@xella.com
Email: torsten.schoch@xella.com
*Corresponding author

Lukasz Drobiec

Department of Building Structures,
Silesian University of Technology,
ul. Akademicka 5, pok. 237
44-100 Gliwice, Poland
Email: lukasz.drobiec@polsl.pl

Biographical notes: Lorenzo Miccoli is a Project Leader at the Xella Technologie- und Forschungsgesellschaft mbH. He was a Research Associate at the Bundesanstalt für Materialforschung und – prüfung (BAM) from 2011 to 2017. He received his PhD in Building Engineering at the University of Rome ‘Tor Vergata’. He was a Visiting Researcher at University of South Carolina in 2016, visiting scholar at Yangzhou University, China, in 2005. His main research focuses on material testing, mechanical characterisation of masonry, finite element modelling, dynamic and static analysis of buildings.

Oliver Kreft is the Head of International Project Management at the Xella Technologie- und Forschungsgesellschaft mbH and has a membership in the German Mirror Committee of CEN/TC 250/SC 8/WG1: ‘Earthquake resistant design of structures, WG1 Masonry’. He is a chemist and completed his PhD at Potsdam University, Germany. After a Postdoctoral fellowship at the Max-Planck-Institute of Colloids and Interfaces (Potsdam, Germany) he took up employment at Xella in 2008.

Torsten Schoch graduated as a civil engineer, is CEO of Xella Technologie- und Forschungsgesellschaft mbH, convener of the Technical Committee of the European AAC Association (EAACA) and of the Technical Committee of the German Mineral Construction Product Association (BBS), member of the board of the German Committee for Masonry (DAfM) and of the German Institute for Standardisation (DIN). Furthermore he is an author of numerous books and publications in building physics, structural design and masonry.

Lukasz Drobiec is an Associate Professor with Post-doctoral thesis and the Head of the Department of Building Structures of Silesian University of Technology, Gliwice, Poland. In 2004, he presented his Doctoral thesis and defended it with honours. In the following year, the Doctoral thesis was granted a distinction by the Minister of Infrastructure. In 2014, he presented his

Post-doctoral thesis and defended it with honours. His research work includes experimental laboratory studies of large masonry and reinforced concrete models, often in the natural scale, subjected to a complex loads. Another area of his research interest is numerical modelling of construction structures, using advanced computational models and diagnosis of structures.

Autoclaved aerated concrete (AAC) has gained worldwide recognition as a high-quality, innovative construction material and has been extensively used in a wide range of residential, commercial and industrial buildings. Recently, there have been a number of innovative developments in AAC manufacturing processes, product properties and construction methods, resulting in enhanced performance to meet increasingly stringent building design requirements while ensuring environmental compliance. Moreover, the characteristics of lightness together with its structural performances allow a favourable use of AAC masonry also in seismic areas. In these areas, the use of lightweight materials contributes to a relevant reduction of the horizontal actions to the building. However, in comparison to other types of masonry, the studies on the seismic behaviour of AAC masonry are still few. For this reason, the aim of the special issue on *Performance and Reliability of AAC Masonry against Seismic Hazard* is to present research into advances in the field of seismic performances of this material. This special issue comprises six contributions from different groups of research. Most of contributions cover a wide range of experimental techniques applied on load-bearing and not load-bearing masonry walls. In addition, a damage assessment of AAC buildings and a numerical evaluation of the in-plane (IP) strength of AAC floor are reported. Some of the topics included in this special issue were presented in the 6th International Conference on Autoclaved Aerated Concrete (6th ICAAC) held in Potsdam on 4–6 September 2018. Accordingly, the articles included in this special issue provide a clear vision of the innovations and challenges of AAC masonry for the international research community.

The paper of Miccoli (2020) provides an overview on the seismic behaviour of infill walls made by blocks of AAC, according to the available literature. Experimental and numerical results on the IP cyclic performance of infill walls are presented. According to the author’s findings, the development of solutions able to assure the isolation of infill walls respect to structural frame seem to be the most promising in terms of damage prevention of the building.

Marinković and Butenweg (2020) focussed on the development of an earthquake-proof system for masonry infills in reinforced concrete (RC) frame structures. This contribution presents the experimental campaign to investigate the effectiveness of the innovative decoupled infill system (INODIS). In the first part, full scale tests on RC frames with masonry infills subjected to IP and out-of-plane (OOP) loading were presented. Finally, a micro model was developed to simulate the IP behaviour of RC frames infilled with AAC blocks with and without application of the INODIS system.

The paper of Lönhoff and Sadegh-Azar (2020) investigates the OOP behaviour of unreinforced AAC walls through shaking table tests. It was assessed the influence of different parameters as vertical stiffness of the support, geometry, constraints, vertical loads and dynamic effects. Finally, the results from analytical models were compared with the maximum acceptable earthquake accelerations determined through the experimental campaign. The results shows that the OOP capacity is much higher than the capacity predicted using analytical models.

Todorovic et al. (2020) presented the effect of openings on the seismic response of AAC infilled frames together with an innovative method to improve their performances. The OOP and IP seismic response of AAC infill walls with openings were investigated through an experimental campaign. A limited deformation capacity of the AAC infill walls was observed. Moreover, the authors proposed an innovative system to improve the performance of AAC infill walls was briefly discussed.

Scotta et al. (2020) focussed on the assessment of IP strength and stiffness of AAC floors without a concrete topping. IP diagonal compression tests on AAC precast panels without a collaborating slab were carried out to assess the behaviour of AAC floors. The experimental results were then applied to two case-study buildings and a numerical simulation was carried out. Numerical results showed an almost rigid behaviour in terms of stiffness, but the IP strength is not always assured in conditions of marked irregularities of the building and high seismic-prone areas.

The paper of Ferretti et al. (2020) presents a damage assessment of some Italian case studies of buildings realised with AAC blocks. The seismic behaviour after the Emilia 2012 earthquake of two pre-seismic code buildings was analysed. In particular, the behaviour of buildings damaged was compared with the seismic behaviour exhibit by modern engineered buildings. Finally, the behaviour of non-structural walls damaged by the Central Italy 2016 earthquake was reported.

The Guest Editors of the special issue on *Performance and Reliability of AAC Masonry against Seismic Hazard* would like to acknowledge all the authors who participated in this special issue as well as to the international panel of reviewers of the submitted manuscripts, who made the publication of this special issue possible. Moreover, they would like to thank the Editor-in-Chief and the team of the *International Journal of Masonry Research and Innovation* for all their valuable support and guidance in putting together this special issue.