Editorial

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It gives me great pleasure to introduce the excellent papers in this September special themed issue of *Structures and Buildings*, focussed on structural design for fire safety. It goes without saying that this is a hugely important for civil, structural and fire engineers working in the built environment, and has been the subject of intensive research for many years. It is in this context that I am particularly delighted to see such high quality research papers included in this issue, demonstrating the advancements that have been made by researchers in this area in recent months and years.

There are 7 papers in the issue, with a wide variety of subjects relating to structures in fire including the performance of different types of steel and concrete elements and bridges under fire loading, as well as the consequence of travelling fires in steel framed compartments. As typical with our journal, the authors span both academic and industrial sectors, bringing a range of views and perspectives.

The first paper by Possidente *et al.*, (2021) brings a new advancement to the understanding of a complex subject that has been scrutinised for the last number of years. The authors utilise fire safety engineering principles to assess the behaviour of a typical steel-framed office building. Two different severe fire scenarios were analysed for the unprotected structure, implying a different degree of building collapse. The second paper, by Charlier *et al.*, (2021) shows how computational fluid dynamics simulations can be employed to analyse the influence of compartment geometry and the interaction with representative fuel loads to explore the conditions leading to the development of a travelling fire.

The next paper by Choi *et al.*, (2021) deals with the fire resistance of bi-directionally prestressed concrete under extreme fire loading, and is particularly motivated by trying to gain an understanding of the behaviour of complex structural elements such as prestressed concrete containment vessels and liquid gas storage tanks, which are constructed as bi-directional prestressed concrete structures to ensure outstanding leak-tight storage and shielding performance. The authors state that these types of structures can be very vulnerable to high-temperature fires owing to the use of high-strength concrete.

The fourth and fifth papers both deal with the response of different types of steel structure under fire conditions. Firstly, in

the paper by Zaharia *et al.*, (2021) the authors conduct a fire protection assessment for the steel beams in a road bridge; this is an interesting topic which has perhaps received less attention from the fire research community in the past, compared with steel buildings. In the paper, the authors assess the impact of a fire in an open car park situated under a road bridge. A number of different scenarios were examined, and the results are extremely interesting, especially in terms of the influence of ventilation. In the fifth paper by Alabi-Bello *et al.*, (2021) present the results of finite-element simulations leading to the development of a design method using the direct strength method for transversely loaded thin-walled steel beams prone to local and distortional buckling failures at elevated temperatures.

The final two papers in this themed issue are both focussed on different aspects of the complex bond relationship that can exist in different structural applications, under fire conditions. The paper entitled by Wu *et al.*, (2021) presents the results of a series of bond tests (i.e. pullout tests) conducted on specimens comprising either a mono- or multi-strand tendon located centrally within a grouted duct inside a concrete cylinder. These were examined at a range of temperature exposures and it was shown that the bond strength deteriorated following exposure to higher levels of elevated temperature. The final paper, by Mathews *et al.*, (2021) covers a topic which has featured a number of times recently in our journal, that is self-compacting concrete, but presents very interesting and new data relating to the fire performance, including test results and analysis, which will be of great interest to our readers.

I am sure that you will greatly enjoy reading these papers, and agree that the recent research into the fire behaviour of different types of structural element is of the highest quality. I hope you find the data and discussion presented to be useful and interesting. As always, comments and discussions from the readers of *Structures and Buildings* are encouraged.

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