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Structures and Buildings

Editorial

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This issue of *Structures and Buildings* is a wonderful advertisement for the breath of research across structural engineering remit, from insight into effects of corrosion in reinforced concrete beams, via numerical modelling of effects of the cycling loading on reinforced concrete (RC) structures and innovative design of slab systems, to benefits of building information modelling (BIM) technologies and insight into performance of full-scale structures.

The issue starts with an experimental insight into dynamic effects of trucks crossing timber bumps placed at the deck of a beautiful cable stayed bridge over the Karakaya dam and reservoir on the Euphrates River in Turkey (Bayraktar *et al.*, 2024). The cables, pylon and deck were all instrumented enabling collection of a substantial insight into the bridge performance. Especially valuable was quantification of the amplification factors and acquisition of a baseline model of the structure that could be invaluable for monitoring and evaluating bridge performance over time.

Another full-scale bridge, combining a cable stayed and arch systems, was tested to ascertain its performance during both construction and post-completion stages (Zhang *et al.*, 2024). Construction is a complex operation, during which it is important to preserve the conditions for which the bridge was designed. Detailed monitoring during construction requires substantial planning and resources. This paper goes to great length to enable comprehensive insight into internal forces throughout construction stages, providing reassurance that the construction was executed according to the plan, and that the completed bridge performs as expected. Again, this study could serve as an invaluable baseline model for analysing bridge performance in the future.

From ensuring that the structure is constructed as per design, this issue is moving to exploring how the construction of modular structures could be made more efficient by utilising digital prototyping technology (Gao *et al.*, 2024). The construction industry has advanced from hand drawings that were mainly used at the time of my degree studies via utilising CAD drawings and is now experiencing digital transformation through building information modelling (BIM). The authors argue that the BIM has role to play in, among other things, ensuring quality control and reducing construction time. A case in point is an impressive speed of construction of the Huoshenshan hospital during Covid-19 pandemic.

The journey in this issue brings us from the structural to element scale in a study by Sadeghi and Nouban (2024). They have proposed a numerical procedure for simulation of the response of RC elements (such as columns, shear walls and beams) to monotonic and cyclic loading. They have utilised an FE based macro–element modelling approach (whereby the structural elements are discretised into fixed rectangular finite fibres) and employed the direct search technique to determine the equilibrium state of the plane strain. Their predictions of the element behaviour were successfully verified using experimental data sets available in literature.

Next, Wang *et al.* (2024) provide a comprehensive theoretical, numerical and experimental insight into flexural capacity of the innovative slabs made of engineered cementitious composites (ECCs) and reinforced by high-strength stainless steel wire ropes. The authors also present a parametric investigation into ways to balance flexural capacity and ductility, which are essential for ensuring high performance of slabs.

The final paper in this issue is a forward looking study on determining probability of failure of deteriorating reinforced concrete beams, that accounts for effects of repairs in prolonging the structural life (Taghipour and Dehestani, 2024). The approach aims to balance maintenance costs and risk of failure in order to enable timely, cost-effective repair interventions and could prove to be valuable in management and maintenance of infrastructure.

Thanks go to all the Authors, Reviewers and Readers. We welcome discussion on any of the papers.

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