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Editorial

Structures and Buildings

Editorial

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As Associate Editor, it is my privilege to bring you the editorial of the May 2026 issue of *Proceedings of the Institution of Civil Engineers – Structures and Buildings*. In this issue, our readership will enjoy seven excellent research articles covering a wide variety of topics focusing on the structural behaviour of elements and buildings. As always, the diverse nature and geographical origin of the articles in this issue highlight the role of civil/structural engineers in all aspects of the built environment, from the foundations of buildings to their behaviour under extreme events.

Our readership interested in the design of steel buildings and codes will find the first contribution by Abarkan *et al*. (2026) very appealing. The authors investigated the flexural resistance of high-strength steel (HSS) doubly symmetric I-beams according to various international codes (e.g. BS EN 1993-1-1:2022, ANSI/AISC 360-22 and AS 4100-2020). Based on an extensive database and parametric influence analyses, the authors demonstrated that the geometric properties of the beams (e.g. depth, flange width and thickness) governed their flexural resistance, whereas material strength played a secondary role within the investigated ranges. While all three standards underestimated the flexural resistance of HSS I-beams, the BS EN 1993-1-1:2022 'new method' with a refinement proposed by Tankova *et al*. (2022) achieved the highest accuracy. A reliability analysis confirmed that the partial safety factors ranged from 1.423 to 1.490, which are acceptable for design.

In the second article of this issue, Mohammadi *et al*. (2026) investigated the flexural behaviour of steel–concrete–steel (SCS) beams using novel one-end welded box-profile (BP) shear connectors, proposed by the authors instead of conventional double-welded connectors. The overlap ratio was varied (0.6, 0.7, 0.8 and 0.9) to evaluate its influence on the structural performance of SCS beams. Based on full-scale tests and finite-element analyses, the authors showed that increasing the overlap ratio improved the stiffness, load-carrying resistance and energy absorption of the beams, thus leading to more ductile behaviour. The beam with an overlap ratio of 0.7 exhibited the most efficient performance. Compared with traditional double-welded connectors, the one-end welded BP configuration provided comparable strength but a simpler and more economical fabrication, thus being suitable for the design/construction of SCS systems.

The dynamic behaviour of existing structures is always challenging to assess and model, and knowledge gaps still remain open. Wei *et al*. (2026) contribute to advancing this topic in their examination of the dynamic behaviour of reinforced concrete (RC) flat slabs under instantaneous column removals. High-fidelity numerical models were calibrated in LS-Dyna to investigate load redistributions and internal force transfer mechanisms. The authors found that, after removing a central column in the models, inertial effects amplified the applied load by a factor of 1.12, with more than 60% of the load ultimately being redistributed to the edge columns. The influence of varying column removal scenarios and structural scales on the dynamic response and collapse resistance of flat slab systems was also explored. It was found that the simultaneous removal of opposite edge columns led to a higher collapse risk than the concurrent loss of adjacent edge columns. Moreover, the evaluation results of scaled RC flat slab structures tended to overestimate both their dynamic load-bearing resistance and punching shear resistance.

Readers with an interest in structure–soil–structure interaction (SSSI) and its effects on buildings are directed to the article by Singhai *et al*. (2026). The authors investigated SSSI effects on adjacent RC buildings by comparing results from response spectrum analysis (RSA), as per the Indian standard IS 1893:2016, against time history analyses. Three-dimensional models of three-storey buildings with a 50 mm gap were analysed in SAP2000 using four Indian earthquake records and different scenarios. It was found that SSSI effects led to force redistributions (from −7% to +16%) compared with SSI analysis alone. Settlements also increased by up to 15.8% under gravity and 10.2% under seismic loading. It was shown that RSA provided a reasonable envelope of SSSI force amplification, but it could not capture duration-dependent settlement effects. The article concludes with design recommendations, which include a 15% force amplification factor for interface footings and wider seismic gaps depending on local soil conditions.

Climate change has increased the number of extreme wind events around the world, which have produced extensive damage or even collapse of structures. In an insightful contribution, Chai *et al*. (2026) studied micro-butterfly windbreak (MBW) nets as protective elements using wind tunnel tests, with the ultimate aim of developing wind load drag coefficients for design codes. The authors performed high-frequency force balance wind tunnel tests on MBW nets with standard 35% and 45% porosity configurations. The results showed that porosity was the key parameter governing the aerodynamic characteristics of MBW nets, while the inflow wind speed had a negligible influence on drag coefficients. The authors recommend drag coefficients of 0.94 and 0.85 for 35% and 45% porosity nets, respectively. They also suggest that load estimations for supporting structures must account for the skewed wind load factor, with the study providing validated reference values and fitting formulas.

The seismic performance of structures is examined in the last two contributions. Zirakian (2026) numerically investigated the seismic performance of RC shear walls with hybrid shape memory alloy (SMA)–steel reinforcement, with the aim of addressing the challenge of residual deformations in conventional shear walls after earthquakes. A user-defined material subroutine was developed in Fortran to simulate the superelastic behaviour of nickel–titanium SMA in Abaqus. The author then modelled/calibrated single and coupled shear wall systems, which were subsequently subjected to non-linear time history analyses using El Centro (1940) and Koyna (1967) earthquake records. The results showed that the SMA reinforcement reduced residual drifts by up to 70–80% compared with walls reinforced with normal steel reinforcement only. Hybrid reinforcement configurations combining SMA and normal steel achieved performance comparable to full-SMA systems, thus offering a more cost-efficient solution and making it more viable in actual designs and projects.

The last article in this issue will be of interest to those involved in the design or construction of elements with fibre-reinforced concrete (FRC). Singh *et al*. (2026) present full non-linear P_u–M_u interaction diagrams for RC columns reinforced with crimped steel fibres (CSFs). The P_u–M_u diagrams were generated through validated sectional analysis in SAP2000. The authors evaluated parameters such as varying fibre volume fractions (0.25–1.50%), aspect ratios (55 and 82) and concrete grades (M20–M40), and subsequently quantified improvements in the structural behaviour of the columns. The results indicate that the CSFs significantly enhanced the curvature ductility (up to 99%), ultimate moment capacity (up to 36%), plastic rotations (up to 163) and the overall P_u–M_u interaction behaviour, thus highlighting the potential of FRC as a structural material. The authors propose incorporating FRC into Indian seismic design codes, which is a commendable effort.

I am certain that readers of this journal will find the contributions in this issue both interesting and useful. As usual, the editorial team is open to receive discussions on the articles, as well as any comments or suggestions you may have. Enjoy your reading!

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