Editorial

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It is my privilege to bring you the editorial of the July issue of *Structures and Buildings*. In this issue, the readers will find six research articles spanning from concrete materials to analysis of long-span bridges. The eclectic nature and origin of these international scientific contributions highlights the role of civil engineers in all aspects of a project, whatever its type, size or location.

The elastic modulus of concrete (E_c) is a property extensively used in design and assessment of concrete structures. However, to date there is limited guidance on how to estimate E_c for concretes made with recycled and secondary aggregates (RSAs), which are becoming more common due to the sustainability agenda adopted by the construction industry. In the first article of this issue, Lye *et al.*, (2021) propose a new empirical model to calculate E_c for concretes made with natural aggregates and different types of coarse/fine RSAs. The aggregate stiffness (which heavily influences E_c) and the possibility of using different types and proportions of aggregates are explicitly considered in the development and calibration of the model, making it quite versatile. Readers working in the field of concrete materials and sustainable materials will find this article particularly stimulating.

The second contribution in this issue addresses the problem of progressive collapse of reinforced concrete (RC) buildings, which is extremely timely given the recent unfortunate events in Miami, Florida. In their article, Alkloub and Allouzi (2021) examine (via finite element analysis) the progressive collapse of RC frames with masonry (brick-mortar) infill walls subjected to column removal. The finite element models are then used to provide further insight into the behaviour of the masonry walls. Based on their findings, the authors also provide a practical model to calculate the peak strength provided by the diagonal struts that develop in the infill wall once a column is removed.

Readers interested in prestressed concrete are invited to read the contribution by Kim *et al.*, (2021), where a new method for shear design of prestressed concrete beams (PCBs) is proposed. The design method is based on a sectional design

approach, and considers that the concrete shear contribution (at each design section of the PCBs) is mainly provided by the undamaged concrete located above the neutral axis. The method is applicable to rectangular, T and I shaped beams. The shear resistance calculated by the new proposed method matches better actual test results, particularly when compared to the resistance calculated by the equations included in ACI 318 (ACI, 2014), Eurocode 2 (BSI, 2004) and the Canadian code (CSA, 2004). The practical design examples of slender and deep PCBs are most appropriate to practicing engineers and/or readers unfamiliar with this subject.

The last three research articles in this issue focus on different aspects of bridge structures. The readership working in design and strengthening of RC bridge superstructures will find the fourth article of this issue particularly interesting. Afefy *et al.*, (2021) present an experimental study on closure strips of precast RC bridge deck slabs subjected to flexural load. Two different geometries of closure strips between the slab panels were filled with either a non-shrink grout, or with an ultra-high-performance strain-hardening cementitious composite (UHP-SHCC). Some of the specimens had insufficient flexural reinforcement to resist the bending moment between the slab panels, and therefore they were strengthened using externally bonded Carbon Fibre Reinforced Polymer (CFRP) sheets. The study found that the specimen with an in-plan 'tongue and groove' closure strip filled with UHP-SHCC and strengthened with CFRP sheets resisted a higher load (about 14%) than its unstrengthened monolithic counterpart.

The next article by Collings and Sagaseta (2021) is relevant to those working in design and assessment of RC bridge deck slabs, but it is also very educational to those less familiar with the subject. The study proposes a simple three-phase linear method to analyse bridge decks. The proposed method explicitly considers the compressive membrane action present in the slab during loading, which leads to better estimations of deflections and load capacities. This in turn can also lead to more economic designs for new bridges. Readers interested in this subject are also referred to a previous article published by Collings (2002) in *Structures and Buildings*.

In the final study, Liu *et al.*, (2021) present a series of finite element analyses that compare the structural behaviour and cost of four types of long-span bridges

- 1) a partial cable-stayed bridge with corrugated steel webs (CSWs)
- 2) a partial cable-stayed concrete bridge
- 3) a cable-stayed bridge with CSWs
- 4) a continuous rigid-frame bridge with CSWs.

The results of the analysis show that, compared to the other types of bridges, partial cable-stayed bridges with CSWs are a feasible and cost-effective structural solution for spans in the order of 200 m.

I am confident that the readers of *Structures and Buildings* will find these scientific contributions both interesting and useful. As usual, the editorial team of the journal is open to receive discussions on the above articles, as well as any comments or suggestions you may have.

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