

Editorial

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Our journal *Construction Materials* tries to provide our readers with the latest scientific insight on ALL our construction materials. Especially with the growing push towards biobased materials we would like to invite authors to submit interesting papers from this area of materials, both from scientific research as well as from practical applications. In the editorial board we are really looking forward to finding more of these types of papers being submitted to our journal.

The current issue of *Construction Materials* has many articles about concrete. That seems justified as those articles have usually somewhere in their introduction a sentence that concrete is the most used construction material in the world. Having read this sentence so many times, I was wondering if this could be substantiated a bit more with actual numbers. A small research into some annual global usage of concrete, crude steel, round wood, bricks, bituminous asphalt and glass, based on data from recent publications over the period 2023–2025, resulted in the numbers presented in Figure 1. From the figure it is indeed very obvious that concrete is the most used construction material in the world, but now at least in perspective to some other well-known materials that we regularly publish about. Please let us know if to your knowledge you think the numbers are really off.

Back to the issue at hand filled with the latest insights. The first article is addressing a practical application to detect small internal cracks in concrete using electromagnetic waves and machine learning. An important topic brought to us by Yamamoto *et al.* (2026). However, particularly the reasoning behind the why for this study may raise some eyebrows. In Japan, it is not only the ageing of reinforced structures that starts to become a problem. Also the shortage and ageing of engineers is now on the radar. Testing and visual inspection of structures requires skilled and experienced personnel. Without these people it is difficult to obtain objective and accurate results. Hence the need for methods that allow inspection with less experienced engineers. Yamamoto *et al.* propose electromagnetic radar in combination with machine learning approaches, convolutional neural networks (CNN) and

convolutional auto encoders (CAE). Please enjoy the article in which they show the existence of cracks in the range of 0.04–1.0 mm in crack width and the possibility of estimating crack growth.

Determining crack widths is just looking at the size of the problem. That is why the article from Abdullatif and AbouZeid (2026) is such an interesting approach, looking from the solution side. In their paper they investigate the self-healing capacity of concrete. For this they use two distinct admixtures that needed to be added to the concrete at the time of construction. The admixtures in their study consist of a) sodium silicate and b) membrane-forming crystalline admixtures (MFCAs). Read their paper for details as they study compressive strength, flexural strength, rapid chloride permeability, water permeability and ultrasonic pulse velocity. As a general conclusion, it can already be stated here that the admixtures for self-healing studied here are more successful for crack sealing than for mechanical strength recovery.

The third paper is addressing responsible consumption and production, one of the sustainable development goals from the United Nations. It takes us to Vietnam where regulations now mandate the use of unburnt materials. These are materials made without firing, typically by pressing or curing, resulting in lower energy use. Examples are soil-cement blocks or compressed earth bricks. Ha (2026) guides us in the article through a selection process for unburnt materials based on a nine-point Saaty scale. By using a fuzzy analytical hierarchy process the article reveals in an evidence-based approach practical implications for policymakers towards their regulations.

It is a small step from soil-cement blocks to soil stabilisation. The latter is the topic of the second paper in this issue, by Khan and Shrive (2026). They focus on improving the engineering properties of silty clay from Calgary, Alberta, Canada. From the article you can learn that the earliest known soil stabilisation occurred roughly 4000 years ago using natural materials and methods such as adding vegetation or other organic substances. In their latest approach Khan and Shrive choose to add either cement or cement

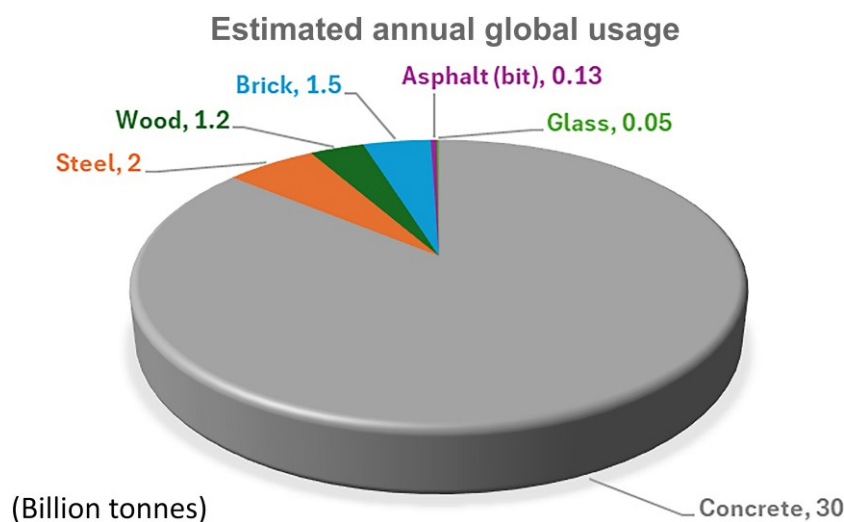


Figure 1. Estimated global usage of the main materials used in construction. Values are provided in billion tonnes and are based on numbers from the period 2023–2025

plus a Duraflex admixture. Unfortunately, the exact composition of the commercial product is not provided in the article, but it does lead to an increase in strength, most likely caused by a reduction in the porosity of the material. Please read the article for details.

A whole different approach towards pores is taken by Sharifi *et al.* (2026) who look particularly to the influence of voids. Their statement is that the mechanical behaviour of a heterogeneous material depends on aggregates and voids. In their study they developed a mesoscale modelling framework using a representative volume element that explicitly incorporates randomly distributed aggregates and uniformly sized voids. Besides the explicit modelling of voids another methodological novelty is the use of incremental stiffness degradation to capture tensile fracture. When cracks initiate, elements under maximum principal stress lose stiffness, progressively degrading neighbours. This leads to gradual global stiffness reduction and realistic fracture propagation.

The final paper of this issue has the focus on mechanical properties of concrete. As concrete, like the authors Negi *et al.* (2026) notice, excels in compression, but exhibit brittleness due to its weakness in tension, a steel companion is necessary to solve the latter. Normally the tension part is taken care of by steel reinforcement, but can it also be achieved by steel fibres? Steel fibres can enhance tensile properties, impact ductility and improve flexural strength. The novelty described in this paper lies in the development of a simplified mechanics-based model tuned for steel fibre reinforced concrete beams without longitudinal reinforcement and its systematic comparison with a data-driven artificial neural network model using

multi-source experimental data. Read in their paper how they reach a root mean square error of 0.97 or higher.

With this travel through the first issue of 2026 of *Construction Materials* I hope the articles will inspire you or teach you or both. Looking forward to seeing the fruits of these experiences back in new articles in upcoming issues of *Construction Materials*. Have a great 2026!

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