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Editorial

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The recent global pandemic has forced change on everyone's daily life, which has resulted in some marked changes in consumption and energy use. It has been estimated that daily global carbon dioxide (CO_2) emissions fell by 17% in April 2020, with industrial emissions falling more steeply; still, the overall reduction for the year is likely to be no more than 7% (Le Quéré *et al*., 2020). More recent data suggest an abrupt 8·8% decrease in global carbon dioxide emissions (−1551 Mt CO_2) in the first half of 2020 compared to the same period in 2019 (Liu *et al*., 2020).

Will the pandemic mark a permanent shift in reduced energy use and resource consumption or will a return to 'normal' be more like the recovery from the financial crisis of 2008, when carbon dioxide falls were more than offset by growth in emissions in subsequent years as economies recovered? To some extent that will depend on governments' actions, where policy can drive step changes, and people's behaviours, where lots of little changes make a significant contribution.

The construction industry, and the waste it generates, has an important part to play in helping reduce resource use by implementing the waste hierarchy and energy-saving solutions in both constructing and operating buildings through their life cycle. This will require developing and widely adopting technological and social innovations for waste prevention, preparing for reuse, recycling and energy recovery, as well as a variety of actions for energy efficiency and production from renewable sources.

In the UK, construction, demolition and excavation (CDE) waste contributes over half of the total waste generated, compared with less than 10% from households; however, over 80% of that CDE waste is recycled or recovered. Concrete, that mainstay of the construction industry can last a lifetime; but at the end of the concrete structure's life, can that concrete be made into new building materials rather than just hardcore?

This issue's research article by Sahoo and Mathew (2020) on the use of recycled concrete as aggregate in structural concrete demonstrates that it can be a valid substitute for virgin aggregates while maintaining product quality. With this approach, less virgin aggregate needs to be extracted and the end-of-life CDE generation is reduced, giving a double benefit to the calculation: reuse of waste now and less waste in the future. This is the very essence of circular economy, our global task for the decades to come, where less of both, waste generation and resource use, is definitely better if not the only way forward for a developing economy in a constrained planet.

It's therefore hoped that such research can be applied in the real world so that contractors use more recovered and recycled materials in project delivery, which will also reduce the embedded carbon dioxide in structures. However, the typical focus on the commercial bottom line may act against this.

Contractors need to be bolder in their project delivery and set aspirational goals to reduce embedded carbon dioxide and operational carbon dioxide through a project's life cycle. This is seen in projects where Totex (total expenditure) is used at the outset of the project to determine the optimum solution rather that the traditional contractor focus on Capex (capital expenditure – large sums spent quickly) potentially to the detriment of the user's Opex (operational expenditure – smaller sums spent over much longer periods).

Many materials can be reused and recycled, but creating a demand that can be reliably supplied while guaranteeing product quality – so that consumers do not notice a difference, but feel better about their purchase by seeing green claims on the product – takes time and effort. It may be that the current pandemic is driving such changes, as it appears that renewable energy exploitation, use of natural ingredients and recycled materials and exhortations to reduce waste are more obvious in the mainstream media. Small changes made by lots of people can have an effect, but changing behaviours takes time while not all marketing claims can be relied on: we all forget our 'bags for life' and much compostable/degradable packaging needs industrialised composting rather than the home compost heap.

As the paper by Göttsche and Kelly (2020: p. 106) notes, the recovery phase of the pandemic represents a (potentially once-in-a-generation) opportunity to decouple the 'connection

between construction output, construction and demolition production and energy use'. The study demonstrates that it is possible to save money, save energy, reduce waste and reduce carbon dioxide emissions at the same time through the use of resource efficiency (RE) measures.

Resource efficiency is a key element in moving from a traditional linear economy (extract, use, dispose) to a circular economy where end-of-useful-life products contribute to new products. This typically requires design for reuse to be considered at the start of the product life cycle. Although recycling rates are generally rising, it has become apparent that there are limits to current recyclability inherent to the design of many products. These limits become even more pronounced when it comes to preparation for reuse.

The case of electrical and electronic equipment (EEE) is characteristic of this challenge, which is recognised and addressed in the recent EU circular economy package directives (specifically for waste EEE, directive 2018/849/EU (EU, 2018)). The pandemic again offers a chance for reflection on our production and consumption models: it has driven a change in working patterns, with many people working from home, saving carbon dioxide emissions from transport but also resulting in increased sales of EEE; without that equipment being designed for end-of-life reuse, we may just create a bigger waste problem in a few years.

The move to a resource-efficient, sustainable future depends not only on waste professionals, who have worked hard to increase recycling and improve waste management techniques, but on designers, manufacturers, engineers, scientists, developers, contractors, clients and consumers to use the 'opportunity' that the pandemic has generated to rethink our entire approach to resources as there is no planet B.

The journal welcomes stand-alone or themed issues targeted contributions on the wider subject of moving forward to circular economy. As knowledge and good practice examples evolve fast, the journal offers rapid access to fresh content in Ahead of Print articles on its Virtual Library homepage. More information about the forthcoming themed issues or proposals for a new theme can be obtained by the journal's office.

Closing, we would like to address an open invitation to young qualified researchers to join the journal's Editorial Panel. Interested candidates may send their CV to the journal office in application.

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