

Editorial

Circular Economy in the Built Environment

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The built environment is the sector with the largest volume of material flow in the global economy. Initiatives to dematerialise the economy have persisted for many decades. However, achieving step-change reductions in a sector of this scale is a complex challenge that proves difficult to measure, despite city development proving to be effective in raising living standards (Bringezu S, 2015). Analysis from the United Nations predicts more than 66 percent of the world's population will be living in urban areas by 2050, compared to 54 percent currently. Matched with an estimated growth of a further 2.5 billion people, the built environment will continue to demand mass volumes of resources (UN, 2014). Evidence-based approaches that deliver real reductions in long-term environmental impact are vital, and this needs to be achieved in cases even where material requirements remain high. Development in this dominant sector demands large-scale technically, socially, and financially viable innovations.

It is argued that the concept of the circular economy has the potential for profound change in civil engineering and infrastructure development projects in particular. Central to this principle is maintaining the maximum resource value of materials whilst preventing losses from the system, so maintaining products in use and material in use are clearly critical. To achieve this product and process re-design, as well as new business models, will become key innovations.

This special issue of Waste and Resources Management focuses on examples of new thinking, new evidence, and new models that can help the civil engineering, infrastructure and built environment sector to reflect on, engage, and embed circular economy principles within its practices.

The papers within this Special Issue cover five key aspects that build upon the first Waste and Resources Management Circular Economy Special Issue, which was published in 2015:

- Large-scale material reuse within a coastal project
- An investigation into the take up of Circular Economy principles in construction
- The concept of material passports to track resource use within the economy
- Cost implications for building certified by the Green Building Index, and
- Analysis of the structure and values of the European Commission's Circular Economy Package

The papers in this special issue build upon the foundations laid out by Julie Hill in the aforementioned issue of WARM; which suggested the built environment sector focuses on *"managing wastes, rather than preserving resources and value through waste prevention, and moving towards a richer understanding of resource stocks, flows and efficiencies"* (Hill, 2015).

Many readers of this journal will be involved with projects in which a change to design, operation or business models could be realised, perhaps to retain the value of materials. While this may not be required by clients per se, solutions that adopt cross-sector collaboration may well be seen as highly desirable. Here, each paper provides evidence of the application of the CE concept within the Built Environment context – and so provides readers with an opportunity to design, inform, assess, and guide the process of maximising resource value, whilst minimising ecological impact. There is much work to be done to achieve general acceptance and understanding of the CE concept in a sector which is characterised by unique projects delivering by temporary multi-party organisations, but the evidence provided in this Special Issue offer significant food for thought and a catalyst for action and further study.

The first paper (Cross, 2017) explains the outcome of a process of partnering during the Crossrail project to create Europe's largest wetland nature reserve. The scale of material movements involved are substantial, yet pragmatic advice around the formation of a technical panel and effective collaboration over a 17

year period, are applicable to large and small projects alike. The author reassures that project scale should not be a deterrent to innovation, but warns that the Waste Framework Directive could be a limiting factor to future project success.

The second paper (Adams et al., 2017) examines the extent to which the concept of circular economy thinking in construction is established. The survey and workshop deliver an important early dataset, which highlights the high level of industry awareness of CE concepts, but the authors recognise a need for improved economic arguments, metrics, tools and guidance for designers and subcontractors to implement these principles in practice. The authors leave us contemplating what constitute a 'clear business case for CE' – a good trajectory for future WARM papers, perhaps.

The third paper (Luscuere, 2017) examines how *Material Passports* may have a place in the marketplace in securing value for material use. The author offers some important new perspectives on CE, and we would expect to see future outputs from the BAMB project offering valuable insights that take our understanding of material tracking information well beyond LCA and EPD.

Cost implications are central to all initiatives and the fourth paper (Chong et al., 2017) reviews the implementation of the Green Building Index rating tool in Malaysia from 2009 as a metric for green building guides. The research identifies the initial cost to achieve certified status and thus the cost premium for green building projects, with implications for developers and policy-makers. The paper attends to a well-rehearsed debate about the true cost premium for green building, and it would be helpful if future research could articulate the cost increase necessary to deliver a building that embedded CE principles. Indeed, such a study might start to provide an answer to Adams et al's call for a clear business case.

Finally, at a time when membership and the influence of the European Commission is never far from the press, the fifth paper from Walter Stahel (2017) presents an analysis and helpful interpretation of the Circular Economy Package (EC CE Package) proposed by the Commission in December 2015. The approach developed from a track-record of environmental

protection and waste management, focusses on the continuous flow of material processes. Natural capital, including water and the bioeconomy, as well as manufactured capital, are included. The process adopts a 'value-preserving stock management' approach, and examines this in achieving the objective to maintain the value of the products, materials and resources for as long as possible, while minimising the generation of waste. Interestingly, Stahel also alludes to the notion of 'junction issues' – this crystallises the sharp edge of the CE debate in the built environment sector and again, offers a useful departure point for subsequent studies.

As the UK, Europe and the world experience political restructuring that is difficult to predict; what remains certain is our dependency on materials in the Built Environment, and thus the value that CE concepts may offer in securing effective use of resources in the future. We hope this Special Issue provides readers with a valuable cross-section of current thought on the Circular Economy.

REFERENCES

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