What's new in the latest editions of the Institution's carbon calculation tools?

IStructE Head of Climate Action, Will Arnold, explains what members can expect from the third editions of *How to calculate embodied carbon* and The Structural Carbon Tool.

The IStructE's *How to calculate embodied carbon* guide (HTCEC), originally published in 2020, was written to provide a common set of principles, recommended data and guidance to improve the consistency and quality of embodied carbon calculations across the structural engineering community. Following its publication, The Structural Carbon Tool (TSCT), developed with Elliott Wood Partnership Ltd, was released in 2021 to enable designers to make rapid embodied carbon reductions in their designs.

The guide and accompanying tool have since reached a large portion of the built environment community – not just structural engineers. The many thousands of downloads of HTCEC and TSCT are spread across disciplines, and around the world. New revisions are now being published following updates to the primary guidance that they are based on: the RICS Professional Standard for *Whole life carbon assessment for the built environment*[1] (the PS).

Key changes

→| **Life cycle modules.** New life cycle modules **(Figure 1)** have been added within the PS, such as A0, which covers emissions before starting works on site, due to extensive site investigations, or flights taken by design teams. Several modules are also now subdivided in the PS, such as A5 (site emissions), which is split into four parts for demolition, construction activities, waste, and worker transport – each of which has a new approach to calculation.

→| **Carbon factors.** We have updated our recommended A1–A3 carbon factors that should be used in early design stages, reflecting current best knowledge and practice. This includes updates to conventional materials such as steel, reinforcement, concrete and timber; a range of less commonly used materials such as bamboo and earth, reclaimed materials; and materials used in bridge design.

→| **Material inclusions.** We have added rule-of-thumb allowances for commonly unmodelled materials, such as reinforcement laps, blinding, steel connections and fire protection.

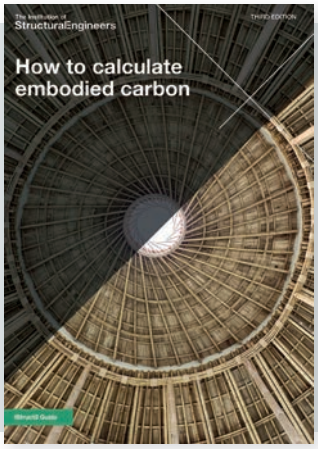
→| **End of life for timber.** Building on the approach taken to subdividing modules where useful, we have taken the step of dividing the C3/4 module for timber into two parts; delineating between end-of-life emissions to the atmosphere, versus transfers to other projects or to nature. While the two should

Get the guide and the tool

When released later this month, both *How to calculate embodied carbon* (3rd edn.) and The Structural Carbon Tool (v3.0) will be available from the Institution website.

→| **Get the guide:** www.istructe.org/resources/guidance/how-to-calculate-embodied-carbon/

→| **Get the tool:** www.istructe.org/resources/guidance/the-structural-carbon-tool/



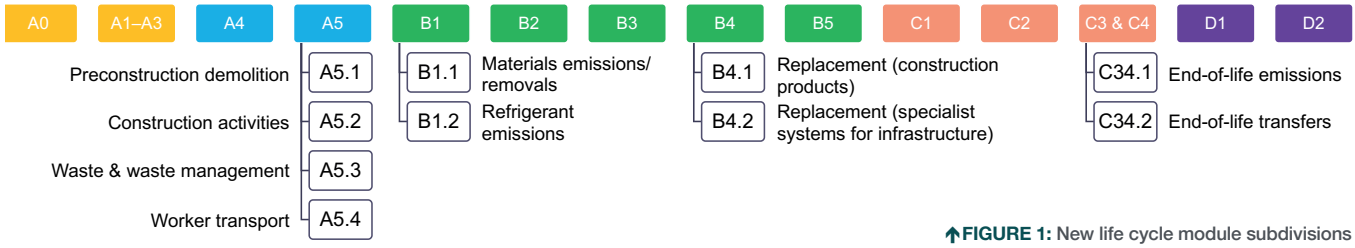


FIGURE 1: New life cycle module subdivisions

be summed when reporting A–C emissions, the breakdown is useful for communicating the benefits of designing timber for deconstruction.

- **Uncertainty factor.** A new aspect of the PS is to add an overall factor to the reported figures, to account for uncertainty around carbon data, quantities, and to add a contingency early in the design process.
- **Predicted material decarbonisation.** This is to be allowed for when reporting emissions in modules B and C, reducing predicted future embodied carbon emissions.
- **Retrofit.** New guidance is provided around normalisation of results for extensions and refurbishments.
- **Bridges.** The previously included appendix of bridge information has been developed further, and incorporated into the main text.

Both HTCEC (3rd edn.) and TSCT (v3.0) will be available from the Institution's website in early September. They will remain free for use to members and non-members alike, continuing to enable easy communication across the industry on this important topic.

We will continue to monitor industry progress, particularly in terms of carbon factors (e.g. we note that the Inventory of Carbon and Energy database is to be updated this year).

On behalf of the Institution, I would like to thank all of those who have volunteered time to produce both HTCEC and TSCT – the lead authors, Orlando Gibbons and John Orr, the Elliott Wood team of Penny Gowler, Tom Hesslenberg and Nick McDonald, and all those who have offered advice or review time during the process.

To provide feedback on either HTCEC or TSCT, please email climateemergency@istructe.org.

REFERENCE

1) Royal Institution of Chartered Surveyors (2023) *Professional Standard: Whole life carbon assessment for the built environment* [Online] Available at: www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment (Accessed: July 2024)

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