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Carbon Skimming: Towards an Application to Summarise and Compare Embodied Carbon to Aid Early-Stage Decision Making

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Abstract : Investors and clients in the Architectural, Engineering and Construction industry find it difficult to understand complex datasets and reports with little to no graphic representation. The stakeholders examined in this paper include designers, design clients and end-users. Communicating embodied carbon information graphically and concisely can aid with decision support early in a building's life cycle. It is essential to create a common visualisation approach as the level of knowledge about embodied carbon varies between stakeholders. The tool, designed in conjunction with Bates Smart, condenses Tally Life Cycle Assessment data to a carbon hot-spotting visualisation, highlighting the sections with the highest amounts of embodied carbon. This allows stakeholders at every stage of a given project to have a better understanding of the carbon implications with minimal effort. It further allows stakeholders to differentiate building elements by their carbon values, which enables the evaluation of the cost-effectiveness of the selected materials at an early stage. To examine and build a decision-support tool, an action-design research methodology of cycles of iterations was used along with precedents of embodied carbon visualising tools. Accordingly, the importance of visualisation and Building Information Modelling are also explored to understand the best format for relaying these results.

Keywords : embodied carbon, visualisation, summarisation, data filtering, early-stage decision-making, materiality
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