

Two Construction Hybrid Life Cycle Assessments

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As evidenced by the growing number of green buildings, the design and construction industries have an increasing interest in and responsibility for a building's environmental impacts, which are considerable over a building's entire life cycle (land acquisition, design, raw material extraction, processing, construction, use, and end-of-life). Quantification of all building phases is important, including the construction phase, which is often disregarded and overlooked. While some existing research has assumed that the impacts of the construction phase are negligible; others have indicated that life cycle assessment (LCA) tends to underestimate the environmental impacts associated with construction. Part of the reason previous assessment of the construction industry's environmental impacts has not advanced is the construction industry's lack of data.

This research focuses on quantifying the environmental impacts of construction by using a methodological LCA framework. A life cycle inventory is generally developed using either a process or input-output (I-O) approach; both techniques have advantages and disadvantages. The main shortcoming of the process model is the subjectivity and inconsistencies of boundary selection, whereas the I-O method produces highly aggregated results. By combining the two methods into a single framework, the best aspects of each are developed, while the weaknesses are minimized.

A review of hybrid model types and explanation of the two methods selected for this research will be presented. To more accurately quantify the environmental impacts of the construction process, a process-based hybrid LCA and input-output-based hybrid LCA are being independently created. Preliminary explanations and results from each model will be introduced and planned case studies that will be used to validate and compare the two models will be outlined. The implications for these models' results creating a more sustainable construction process will be discussed.