

Development of a Life Cycle Inventory Dataset for Recycled Concrete Aggregates in the City of Abu Dhabi

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Abstract – Environmental life cycle inventory (LCI) datasets are critical to conduct life cycle assessment (LCA) of concrete products. Obtaining these values from local practice is necessary to provide accurate assessment results that reflect real-life scenarios. The datasets for the recycling process of construction and demolition waste into recycled concrete aggregates (RCA) in the city of Abu Dhabi, United Arab Emirates are currently unavailable. Accordingly, this research aims to determine a detailed environmental LCI dataset for the production of RCA in Abu Dhabi. An extensive investigation of the RCA production practice was performed to highlight the input and output of each process unit. The methodology proposed by the International Standards Organization (ISO) to build an LCI (ISO 14040) was adopted. The resulting environmental LCI value for RCA production was determined to be 6.67×10^{-4} kg CO₂eq per kilogram of produced RCA. Research findings serve as a benchmark to evaluate the environmental sustainability of RCA and RCA-based products in a holistic LCA study, while also enriching the LCI of the city of Abu Dhabi.

Keywords: Recycled concrete aggregates, Life cycle assessment, Life cycle inventory, Construction and demolition waste.