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ENVIRONMENTAL ASSESSMENT OF A PRECAST CONCRETE BUILDING STOCK IN A TIME PERSPECTIVE

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Abstract

The sustainable refurbishment of the existing building stock is a key issue in achieving the ambitious long-term energy and environmental goals of the European Union. Europe has a vast building stock built with prefabricated reinforced concrete large-panel construction technology after World War II to decrease the general housing shortage, mostly in the Eastern-European countries and East Germany.

This study focuses on the environmental evaluation of the retrofitting of the existing precast large-panel building stock in Hungary and provides a decision support tool for the architectural design process by identifying the largest environmental impacts. Different scenarios, including demolition/new construction and various refurbishment levels, were analyzed through life cycle assessment and considering the potential impacts throughout the building's lifetime. The effect of building lifetime and calculation period on the environmental performance was evaluated in detail.

The typology of the precast large-panel building stock was set up by grouping buildings according to their age, architecture and technical parameters. The methodology is demonstrated on a case study area: the Kelenföld housing estate in Budapest (Hungary) built in 1965-75 was chosen for the analysis. After assessing the environmental performance of the determined types, the mitigation potential of the housing estate was estimated.

Key words: building typology, concrete building, life cycle assessment, life time, precautionary principle, refurbishment scenarios

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