

Investigating the environmental performance of two traditional burial systems and establishing a construction waste recycling system using the life cycle assessment approach (case study: Isfahan)

Introduction: This study investigates the environmental performance of two traditional burial systems and the establishment of a construction waste recycling system using the Life Cycle Assessment (LCA) approach in the Zainel Pass area of Isfahan, Iran. The improper management of construction waste globally has led to significant environmental and economic challenges, including soil and water pollution, greenhouse gas emissions, and excessive consumption of natural resources.

Material and Methods: The research aims to compare the environmental impacts of two scenarios: traditional burial and recycling of construction waste. Using the LCA method and SimaPro software, the environmental effects of both scenarios were evaluated, focusing on human health, ecosystem damage, climate change, and resource consumption.

Results and Discussion: The results indicate that burying construction waste in Zainel Pass has significant negative impacts, with 86.1% on human health, 4.3% on ecosystem damage, 8.1% on climate change, and 4.2% on resource consumption. In contrast, the recycling scenario shows a reduction in these impacts, with 114.1%, 1.3%, 7.3%, and 5.5% respectively, due to decreased extraction of natural resources. The recycling process involves the separation, crushing, and production of recycled aggregates, which not only reduces the need for virgin materials but also minimizes environmental pollution.

Conclusion: The study highlights that recycling construction waste can significantly mitigate environmental impacts, particularly in reducing greenhouse gas emissions and conserving natural resources. The findings suggest that implementing a recycling system in Isfahan could lead to substantial environmental benefits, including improved air and water quality, reduced land use for waste disposal, and decreased energy consumption. The research underscores the importance of adopting sustainable waste management practices, such as recycling, to address the growing environmental challenges associated with construction waste. Policymakers and industry stakeholders are encouraged to promote recycling initiatives through effective regulations, public awareness campaigns, and incentives for sustainable practices.

Keywords: life cycle assessment, construction waste, waste management, recycling, Isfahan