

Sustainable Material Selection for Buildings: Analytic Network Process Method and Life Cycle Assessment Approach

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Abstract : Over the recent decades, depletion of resources and environmental concerns made researchers and practitioners present sustainable approaches. Since construction process consumes a great deal of both renewable and non-renewable resources, it is of great significance regarding environmental impacts. Choosing sustainable construction materials is a remarkable strategy presented in many researches and has a significant effect on building's environmental footprint. This paper represents an assessment framework for selecting best sustainable materials for exterior enclosure in the city of Tehran based on sustainability principles (eco-friendly, cost effective and socio-cultural viable solutions). To perform a comprehensive analysis of environmental impacts, life cycle assessment, a cradle to grave approach is used. A questionnaire survey of construction experts has been conducted to determine the relative importance of criteria. Analytic Network Process (ANP) is applied as a multi-criteria decision-making method to choose sustainable material which consider interdependencies of criteria and sub-criteria. Finally, it prioritizes and aggregates relevant criteria into ultimate assessed score.

Keywords : sustainable materials, building, analytic network process, life cycle assessment

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