

A FUZZY ANALYTIC NETWORK PROCESS APPROACH TO EVALUATE CONCRETE WASTE MANAGEMENT OPTIONS

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ABSTRACT

This research proposes an evaluation model using fuzzy analytic network process (FANP). Construction and Demolition (C&D) waste constitute a major portion of total solid waste production in the world, and most of it ends up in landfills. Among various types of materials, concrete waste accounts for about 50% of the total waste generation. The current practice of dumping construction materials to landfills generates a significant quantity of waste from construction sites. Due to increasing concrete waste volumes and shortage of landfills, waste management has become a significant concern. The main objective of this paper is to present a decision-making methodological framework using Fuzzy Analytical Network Process (FANP), which will prioritize recycling options. Given the complexity and difficulty of evaluating concrete waste management options toward competitive, quantitative and qualitative criteria with interactions and dependencies, the current study has employed the ANP method as one of the Multi-Criteria Decision-Making (MCDM) tools. Qualitative criteria are often accompanied by ambiguity during value judgment. To deal with this incompetency, the fuzzy approach has been used. The weight matrices of criteria and sub-criteria are constructed by using triangular fuzzy numbers. In addition, this evaluation is carried out by a group of decision-makers coming from different areas including government, NGOs (non-governmental organizations) and people with the intention of providing a more accurate and mutually acceptable solution. The results are not only a foundation to implement the sustainable concept and a recommendation for the government's related policy making, but also provide guidance for future planning and practices.

Keywords: *Fuzzy Analytic Network Process (FANP), concrete waste, waste management.*