Environment Impact Evaluation for Construction Engineering: An ntegration of Fuzzy Analytic Network Process and Fuzzy Lo

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ABSTRACT

The purpose of environmental impact assessment is to identify, assess and describe the likely impact of proposed activities on the environment, analyse the possibilities for the prevention and mitigation of such impact and make proposals regarding the choice of the most suitable solution. The essential of environmental impact assessment (EIA) is decision-making. Although decision analysis techniques such as multi-criteria decision analysis (MCDA) have been widely recognized as a primary methodology for EIA, several assumptions about criteria are inappropriate: criteria are independent; criteria are well-defined; and criteria are certain. The inappropriateness arises from the insight into EIA. First, some of environmental factors are not independent. Second, qualitative assessment is pervaded by fuzziness. Third, subjective assessment has an important role in EIA. To address these issues, this research proposes an integration of fuzzy analytical network process (FANP) and fuzzy logic (FL) to take care of the dependence problem among environmental factors, the fuzziness of environmental factors, and the subjectiveness in evaluating environmental factors. Finally, a real case of Taiwan High Speed Rail is studied to demonstrate the use of the proposed method.

Keywords : environment impact assessment ; fuzzy analytical network process ; fuzzy logic

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