



The Risk Assessment of Dam Construction Projects Using Fuzzy TOPSIS (Case Study: Alavian Earth Dam)

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Abstract

One of the appropriate tools for conducting a successful project is the risk management during the implementation of the project. Dam construction projects are complex projects with high impact factors such as variable and uncertain conditions. To identify the risks of project, experts' experiences and comments including mind storm and consultation sessions were used. Risk analysis is a complex issue. Therefore, in this paper, the fuzzy multiple criteria decision making (FMCDM) technique was used to rank the risk which is a powerful and effective tool in solving complex problems under uncertain and implicit conditions. Due to the uncertainty in the language, fuzzy data were used for the quantitative analysis of the probability and severity of effects and the repetition of risks taken into account. The present research was conducted on Alavian dam in the northeast of Iran. Due to the result of the study, design mistakes' risk (R4) has the highest level of risk and earthquake, etc. has the lowest level of risk in Alavian dam project.

Key word: Risk Management; FMCDM; Uncertain Conditions; Dam Construction.

1. Introduction

Dam projects in the world are conducted with different objectives such as water supply, drinking water supply for agriculture, industry, flood control and energy supply as well as the potential energy supply to construct powerhouses. The high cost of dams' construction requires a correct and efficient management in such projects. (Rahimi, 2003; Cooke et al., 1992). Therefore, one of the main reasons of delaying and increasing costs of dam projects is the inadequate and weak management, especially the risk management. Risk ranking and assessment are the key section in risk management. (Ahangari et al. 2010) Because with ranking, the superiority of a risk over other risks is identified and therefore the main factors involved in the project can provide an appropriate planning for the allocation of existing resources to deal with any risk. A correct understanding of project risks will lead to a correct risk management. Risks collection and prioritization based on the occurrence probability and their impact on the project is very important and influential (Jozi & Seyfossadat, 2014). A large number of risks produced during the risk management process should be classified in such a way that they can be properly assessed and used as a principle in the powerful and effective management of the project. Considering numerous and inaccurate criteria, risk assessment is a multiple criteria decision making problem and because of uncertainty in language, it has a fuzzy nature. Therefore, to obtain the significance degree of each criterion, fuzzy multiple criteria decision making method can effectively analyze and rank the general impact of risk by combining the effect of criteria such as repeatability, occurrence possibility and degree of

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