Civil Infrastructure Researches, Vol. 6, Issue.1, Spring and Summer 2020, pp. 41-53

Evaluation and Management of Geotechnical Risk in Tunneling Projects Using Fault Tree Analysis

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One of the important steps in designing and implementation of tunneling projects is analyzing and managing the risks from the viewpoint of geotechnical risks. Second part of the Emamzadeh Hashem tunnel is one of the greatest civil projects in Iran that has faced with serious and important challenges in design because of the poor geological structure and geotechnical condition in excavation track. In this research, try to be after the geological studying in the tunnel excavation track, the overall risk amount be assessed by fault tree analysis. During this study, 4 important event including damage to the personnel, damage to the TBM, damage to the restraint system and deflection from the excavation track was identified and studied by using the geotechnical hazards like: encounter to fault and comminuted areas, squeezing, water inrush and tunnel instability. Results of the analysis show that reasons of the higher risk in this project are damage to the TBM and damage to restraint system. So, the higher risk should be reduced by doing some reducer proceedings like concrete injection. After these proceedings, the overall risk came to the poor area in the risk classification. According to the results, in this project, damage to the TBM and damage to restraint system have the highest risks and their risks should be reduced by doing some reducer proceedings like concrete injection. After these proceedings, the overall risk came to the poor area in the risk classification.

Keywords: Geotechnical risks, Fault Tree Analysis, Risk Management.

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Received 09 April 2020, Revised 04 August 2020, Accepted 30 September 2020.
DOI: 10.22091/cer.2020.5388.1200