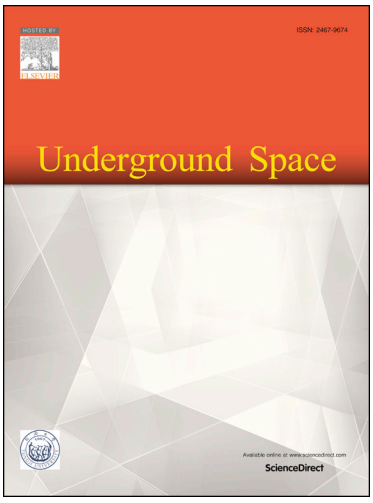
Accepted Manuscript



Reliability analysis of shallow tunnels using the response surface methodology

Adam Hamrouni, Daniel Dias, Badreddine Sbartai

PII: S2467-9674(17)30095-8
DOI: https://doi.org/10.1016/j.undsp.2017.11.003
Reference: UNDSP 35

To appear in: *Underground Space*

Received Date: 23 September 2017
Revised Date: 9 November 2017
Accepted Date: 13 November 2017

Please cite this article as: A. Hamrouni, D. Dias, B. Sbartai, Reliability analysis of shallow tunnels using the response surface methodology, *Underground Space* (2017), doi: https://doi.org/10.1016/j.undsp.2017.11.003

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Reliability analysis of shallow tunnels using the response surface methodology

Adam HAMROUNI[1,2], Daniel DIAS[1], Badreddine SBARTAI[3]

[1]Grenoble Alpes University, Laboratory 3SR, Grenoble, France

[2]Mohammed Cherif Messaadia University, Laboratory *InfraRes*, Souk-Ahras, Algeria

[3]Department of Civil Engineering, University Bdji Mokhtar Annaba & LMGHU Laboratory, University 20Aout 1955 Skikda, Algeria

Abstract

A probabilistic study of a circular tunnel excavated in a soil mass using the response surface methodology (*RSM*) is presented. A deterministic model based on two-dimensional numerical simulations in a transversal section is used, and the serviceability limit state (*SLS*) is considered in the analysis. The model permits the surface settlement curve and the bending moment on the tunnel lining to be obtained. Only the soil parameters are considered as random variables. The first-order reliability method (*FORM*) and the response surface methodology (*RSM*) are utilized for the assessment of the Hasofer-Lind reliability index (β_{HL}) optimized by the use of a genetic algorithm (*GA*). Two assumptions (normal and non-normal distribution) were used for the random variables. The comparison analysis considering a correlation between the friction angle and the cohesion indicates that the results are conservative if a negative correlation among strength parameters is not taken into account.

Download English Version:

https://daneshyari.com/en/article/6784391

Download Persian Version:

https://daneshyari.com/article/6784391

Daneshyari.com