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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Three dimensional slope stability problem with a surcharge load" *by* Y. M. Cheng et al.

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Please note that the symbol phi in the text is different from that in the figure. This is due to the fact that the system of the Journal use a different phi symbol.

The reply to the reviewer's comments are marked in blue in the attached pdf file.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 1291, 2015.

Three Dimensional Slope Stability Problem with a Surcharge Load

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Abstract : A semi-analytical solution for the three dimensional stability analysis of the ultimate uniform patched load on top of a slope is developed by the limit analysis using kinematically admissible failure mechanisms. The failure mechanism which is assumed in the analytical solution is verified by three-dimensional strength reduction analyses and laboratory model test. Furthermore, the proposed method and the results are further compared with some published results for illustrating the applicability of the proposed failure mechanism.

Key words: Safety factor, three-dimensional slope failure mechanism, patch load, bearing capacity

Introduction

Many practical geotechnical problems are three dimensional in nature, yet two-dimensional plane-strain analysis is commonly used for simplicity of analysis. This pertain to problems as natural slopes, cut slopes and fill slopes for which the failure regions usually have finite dimensions, and the actual problems are far from

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Fig. 1.

Reply to reviewer's comment

Thanks to the comment, a revised manuscript addressing all the comments has been prepared. The revisions are marked in blue in the pdf file for reference :

1. A section on the 3D failure mechanism in general is added. The details of the geometry are further elaborated in the manuscript.
2. The looping method with some discussion is further elaborated.
3. The authors have used the term "semi-analytical" to better reflect the nature of the present work.
4. Comparisons with Michalowski's model is further elaborated.
5. Fig.1 and 2 are revised. Coordinate system for b is added, h is added in Fig.2
6. Line 10, p.1297 is corrected (actually correct for my word file but is not for the pdf generated by the system). For line 20 of p.1312, I think it is correct.
7. A section on the discussion of tensile strength is added. Since the effect is too small, I have not prepared another figure for illustration.

Fig. 2.