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Determining Ground Water Table in Slopes with Horizontal Drains and Design Framework for Length and Spacing

S.O.A.D. Mihira Lakruwan, Akiyoshi Kamura, Motoki Kazama

APPENDIX A

2D Stability Analysis Using Average GWT Profile ($Z_{w(avg)}$)

A series of 2D FE stability analyses were performed on the Slope I, using the average GWT profiles obtained by the proposed semi-empirical method. In order to address discrepancies between the different numerical codes, a 1 m thick model in PLAXIS 3D was utilized for 2D analyses.

As shown in Figure A.1, the ΔFS values obtained from the 3D and 2D FE models are in good agreement. The slight underestimation of ΔFS by the 2D FE model can be attributed to the overestimation of the GWT profile by the proposed semi-empirical method. The S= 0, (blanket drain conditions), is similar to those of the HDs in the 2D simulations. Thus, the 2D simulations overestimated the FS levels of a slope with HDs. This is further revealed in Figure 13. When the S = 0, U values are underestimated (Figure 13 (a)) result in overestimation of ΔU. Therefore, by using the average GWT profile obtained from the proposed method in 2D stress-deformation numerical models, FS increments of a slope with HDs can be obtained efficiently while overcoming the difficulties associated with 3D simulation models.

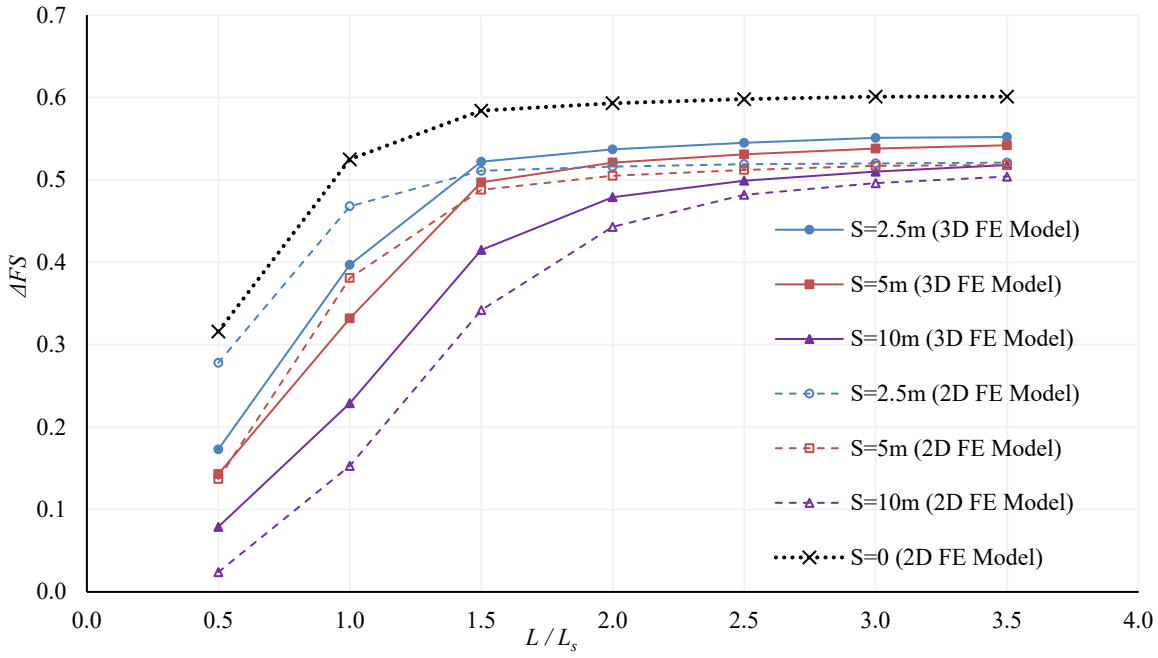

Figure A.1. Comparison of *ΔFS* obtained from the 3D FE models and counterpart 2D FE models that use the GWT profiles obtained from the proposed semi-empirical method.