



3D DEM analyses of the 1963 Vajont rock slide

Chia Weng Boon (1), Guy Housby (1), and Stefano Utili (2)

(1) Department of Engineering Science, University of Oxford, Oxford, UK, (2) School of Engineering, University of Warwick, Coventry, UK

The 1963 Vajont rock slide has been modelled using the distinct element method (DEM). The open-source DEM code, YADE (Kozicki & Donzé, 2008), was used together with the contact detection algorithm proposed by Boon et al. (2012). The critical sliding friction angle at the slide surface was sought using a strength reduction approach. A shear-softening contact model was used to model the shear resistance of the clayey layer at the slide surface. The results suggest that the critical sliding friction angle can be conservative if stability analyses are calculated based on the peak friction angles. The water table was assumed to be horizontal and the pore pressure at the clay layer was assumed to be hydrostatic. The influence of reservoir filling was marginal, increasing the sliding friction angle by only 1.6° . The results of the DEM calculations were found to be sensitive to the orientations of the bedding planes and cross-joints. Finally, the failure mechanism was investigated and arching was found to be present at the bend of the chair-shaped slope.

References

Boon C.W., Housby G.T., Utili S. (2012). A new algorithm for contact detection between convex polygonal and polyhedral particles in the discrete element method. *Computers and Geotechnics*, vol 44, 73-82, doi.org/10.1016/j.compgeo.2012.03.012.

Kozicki, J., & Donzé, F. V. (2008). A new open-source software developed for numerical simulations using discrete modeling methods. *Computer Methods in Applied Mechanics and Engineering*, 197(49-50), 4429-4443.