



## **The influence of root reinforcement depending on the shape and the dimension of shallow landslides**

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The implementation of root reinforcement in slope stability calculations still not well solved until now. Different approaches are proposed in literature considering cohesion or friction angles changes, but most of them have only a two-dimensional application (infinite slope). The aim of this work is to better understand which is the importance and the influence of the different combinations of lateral (scarp) and basal root reinforcement in the different dimensions and shapes of a shallow landslides. In the first part we have analysed the most common characteristics of some shallow landslides documented in Switzerland and Italy (shape, dimension, soil type, etc.). In the second part we have developed a simple algorithm based on a three-dimensional approach, and finally we have performed slope stability calculations with different combinations of parameters. As expected, the first results show that plausible values of lateral (scarp) root cohesion (literature values) are significant for little landslides and their importance increases with the complexity of the landslide shape. Possible changes in the values of internal friction angle due to the soil structure and roots, seem to play an important role in the basal strength, also within little increments ( $1-2^\circ$ ). However, the analysis of real shallow landslides show that in their mean dimension (100-200 m<sup>2</sup>) the influence of lateral root cohesion decrease strongly.