Centrifuge modelling of slope stabilized by piles

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Four decisive factors (namely, pile spacing ratio, bending stiffness, slerderness ratio and upslope soil lengh) for slope stabilization using piles are examined through centrifuge modelling. The failing slope is modelled by a soil layer sliding above a stationary layer. Four pile spacings, two pile bending stiffnesses, two slenderness ratios and three upslope soil lengthes were considered. Four failure modes and their relations to those factors have been revealed: (1) Local soil failure in the downslope soil trends to happen when piles with high relative stiffness are adopted and the pile spacing ratio is small. (2) Soil flows around the piles when high stiffness piles arranged in large spacing ratio. (3) The overtop movement of upslope soil above the stabilized part of the soil is concerned when the pile stiffness is relatively low or the upslope soil length is big. (4) Bending failure in the piles can be accompanied by any of the three failure modes above. However, it tends to occur when big spacing is adopted since larger sliding force is applied on a single pile under this circumstance.