RESPONSE OF MICROPILES IN EARTH SLOPES FROM LARGE-SCALE PHYSICAL MODEL TESTS

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ABSTRACT

Micropiling is an efficient method used for stabilizing the problematic slopes. However, load transfer in micropiles is not well understood when the load is applied by the soil movement. The objective of this research is to provide a method for estimating limit loads more accurately on piles. Fourteen tests with different pile arrangement and spacing ratios were performed in a large-scale laboratory apparatus. During testing, strains on the micropiles, pore pressures in the slope and soil movement were monitored and recorded continuously. Load transfer on piles within moving soil was analyzed using soil-structure interaction methods. Based on measured soil movement and predicted failure surface profiles, pile response analyses were performed to back-calculate "best fit" *p*- and *y*- multipliers that would produce the best match between the predicted and measured responses. The back-calculated parameters were compared with values from literature and with one another to accomplish the objective of this study.

As a result of this study, a method is developed to be able to obtain *p*- and *y*- multipliers for combination of any spacing and batter angle. Results of analyses indicate that spacing ratio and batter angle are important factors that influence the limit soil pressure/resistance. Data suggests that limit soil pressure increases with closer spacing. Batter angle is observed to have the greatest effect on limit soil pressure. Data shows that available resistance increases from upslope pile towards downslope pile. Effect of pile diameter on limit soil pressure was also not observed within the scatter of data.