

Cantilever Secant Pile Constructed in Sand: Capping Beam Analysis and Deformation Limitations

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Abstract : This paper fits in soil-structure interaction division. Its theme is soil retaining structures. Hence, the cantilever secant-pile wall imposed itself, focusing on the capping beam. Four research questions are prompted and beg an answer. How to calculate the forces that control capping beam design? What is the statical system of 'capping beam-secant pile' as one unit? Is it possible to design it to satisfy pre-specific lateral deformation? Is it possible to suggest permissible lateral deformation limits? Briefly, pile head displacements induced by Plaxis-2D are converted to forces needed for STAAD-Pro 3D models. Those models are constructed based on the proposed structural system. This is the paper's idea and methodology. Parametric study performed considered three sand densities, one pile rigidity, and two excavation depths, i.e., 3.0 m and 5.0 m. The research questions are satisfactorily answered. This paper could be a first step towards standardizing analysis, design, and lateral deformations checks.

Keywords : capping beam, secant pile, numerical, design aids, sandy soil

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