

Two Lessons Learnt in Defining Intersections and Interfaces in Numerical Modeling with Plaxis

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Abstract : This paper is going to discuss two issues encountered in using PLAXIS. Both issues were monitored during application of PLAXIS to estimate the excavation-induced displacement. Column Soil Mixing (CSM) was applied to stabilise the excavation. It was understood that the estimated excavation induced deformation at the top of the CSM blocks highly depends on the material type defining pavement material adjacent to the CSM blocks. Cohesive material for pavement will result in the unrealistic connection between pavement and CSM even by defining an interface element. To find the most realistic approach, the interface defined in three different manners (1) no interface elements were applied (2) a non-cohesive soil layer was defined between pavement and CSM block to represent the friction between these materials (3) built-in interface elements in PLAXIS was used to define the boundary between the pavement and the CSM block. The result showed that the option 2 would result in more realistic results. The second issue was in the modelling of the contact line between the CSM block and an inclined layer underneath. The analysis result showed that the excavation-induced deformation highly depends on how the PLAXIS user defines the contact area. It was understood that if the contact area had defined as a point in which CSM block had intersected the layer underneath the estimated lateral displacement of CSM block would be unrealistically lower than the model in which the contact area was defined as a line.

Keywords : PLAXIS, FEM, CSM, Excavation-Induced Deformation

Conference Title : ICSMGE 2019 : International Conference on Soil Mechanics and Geotechnical Engineering

Conference Location : Sydney, Australia

Conference Dates : December 02-03, 2019