

Advisory Notes on PLAXIS 3D 2017 for ELS Analysis

1. Check on capacity of structural elements

1.1 PLAXIS does not carry out design check of structural elements used in the model. Users must check the adequacy of these elements using relevant design codes accepted by Hong Kong Building Authority. If the design indicates stronger elements are required, the PLAXIS model must be revised and re-analysis accordingly.

2. Wall/Soil Interface

2.1 The wall/soil interface ratio R_{inter} should not be unrealistically low to avoid numerical instability leading to non-convergence. The limiting values for R_{inter} should use values in Table 13 of Geoguide I (GEO, 1993).

3. Effects of Mesh Size on Accuracy of Results

3.1 The mesh/element size to be adopted in the analysis should be suitably fine so that further refinement of the mesh/element size would not generate a significant change in the analysis results. A finer mesh/element size may also be required at the areas of stress/flow concentration or zones of large deformation/hydraulic gradient. Despite more accurate result can be achieved with excessive fine mesh, it should be noted that the computation time would also be greatly increase. Users should consider the balance between result accuracy and computation time before carrying out the analysis.

4. Selection of Soil Models

4.1 For drained analysis, user should use effective stress shear strength parameter in the linear elastic perfectly plastic model with Mohr-Coulomb failure criteria to model soil behaviours.

5. Requirement for Convergence

5.1 Excavation is an unloading problem. Hence, the PLAXIS calculation for ELS works is a load-controlled analysis. Users should use the default setting where the "Arc-length control" function for iteration of calculation is activated. Under special circumstances of large shear strains and significant plasticity developing in the mesh elements, the user may deactivate the "Arc-length control" function to force the analysis to solve to convergence (see PLAXIS manual under Iterative Procedure Control Parameters). In such a case, the user must check whether the shear strains generated in the mesh indicate development of a global failure mechanism. If the analysis has predicted a global failure mechanism, the user should re-activate the "Arc-length control" function and re-run the analysis. If there is no convergence, then the wall embedment depth should be increased.