

Face stability analysis of a shallow tunnel using coupled Eulerian-Lagrangian technique

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ABSTRACT

The face stability analysis of a shallow tunnel were analyzed in various condition, which is excavation angle (α), cover diameter ratio (C/D), and internal friction angles of soil (ϕ). The laboratory tests and large deformation finite analysis using coupled Eulerian-Lagrangian technique were conducted to investigate the behavior of excavation-induced settlement. The applicability of the coupled Eulerian-Lagrangian (CEL) technique for the failure and post-failure behaviour of soil in tunnel excavation was verified. The result show that the larger C/D and ϕ , and the smaller α , the smaller the settlement occurred. It can be expected to minimize the settlement due to excavation through the interaction of excavation angle and internal friction angle of soil.

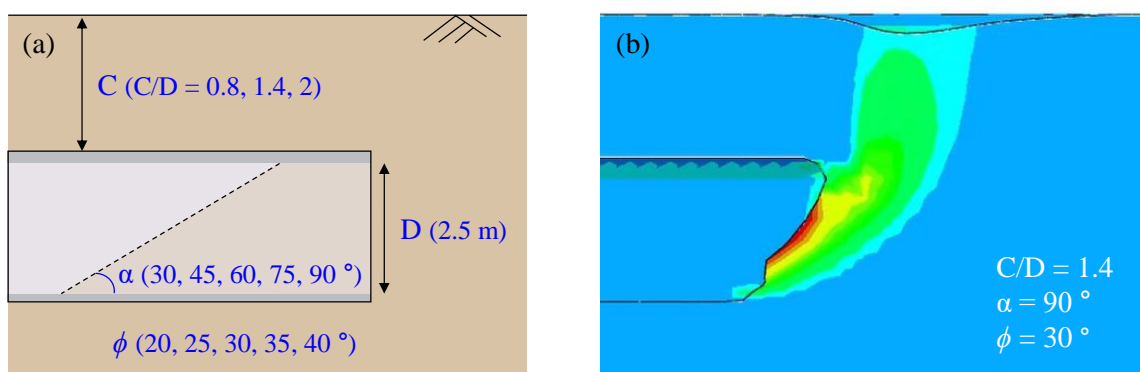


Fig. 1 Large deformation finite element analysis; (a) a schematic diagram of the model, (b) a typical result of analysis

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