

Simulation of the Screw Driving Sounding (SDS) test in sandy soil using Smoothed Particle Hydrodynamic method in Abaqus

†*S.Y. Mirjafari. M¹, R. P. Orense¹, and R. Das²

¹Department of Civil and Environmental Engineering, University of Auckland, NZ.

²Department of Mechanical Engineering, University of Auckland, NZ.

*Presenting author: smir332@aucklanduni.ac.nz

†Corresponding author: smir332@aucklanduni.ac.nz

Abstract

Recently, finite element method has been considered as a powerful tool for solving geotechnical boundary value problems. In this paper, driving a screw point during the Screw Driving sounding (SDS) test, which is a new in-situ testing method for soil/site characterisation, is simulated using ABAQUS software. The Screw Driving Sounding (SDS) test consists of a machine that drills a rod into the ground at different steps of loading while being rotated. Smoothed Particle Hydrodynamic (SPH) technique was utilized for handling the very large distortion of soil surrounding the screw point. Simulation results proved that the model successfully captured the drilling process of SDS screw point into the sandy ground. The FEM model was validated by results of laboratory tests performed on samples taken from the sites adjacent to the location of the SDS tests. In addition, a chart to predict internal friction angles based on SDS parameters for different vertical effective stresses was developed

Keywords: Screw Driving Sounding, Smoothed Particle Hydrodynamics, ABAQUS, Finite Element analysis