ACESA, Vol. 1, No. 1, March 2018,7-8 publication.petra.ac.id/index.php/ACESA

Extended Abstract

Lateral Soil Movement Due To Jack-in Single Pile Installation

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Key Words: *lateral soil movement, PLAXIS 2D, jack-in pile installation, single pile, cylindrical cavity expansion.*

Pile installation with jack-in method has been commonly used. Yet, this method may cause adjacent lateral soil movement. Consequently, it may also damage structures around the piling area. The prediction of soil movement due to the pile installation can be calculated theoretically using various formulas and computer simulations. The prediction of lateral soil movement has been calculated theoretically by previous researchers [1], [2], [3], and [4]. In the present research, using PLAXIS 2D data that implements *cavity expansion* theory as the *prescribed displacement*, the lateral soil movement due to single pile installation is predicted. An example of an actual observation result and several lateral soil movement predictions on the surface to the distance divided by the pile length is shown in Fig. 1.

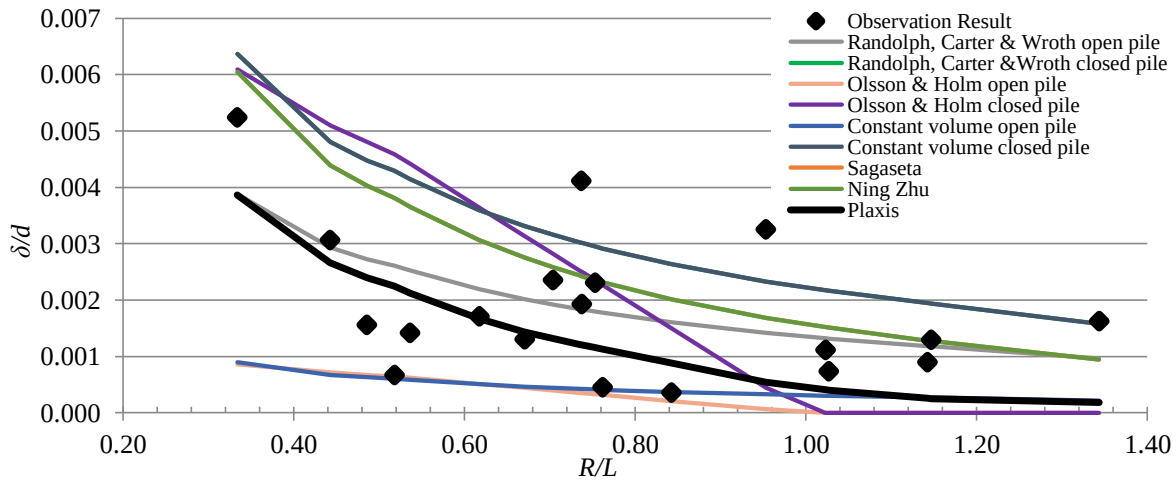
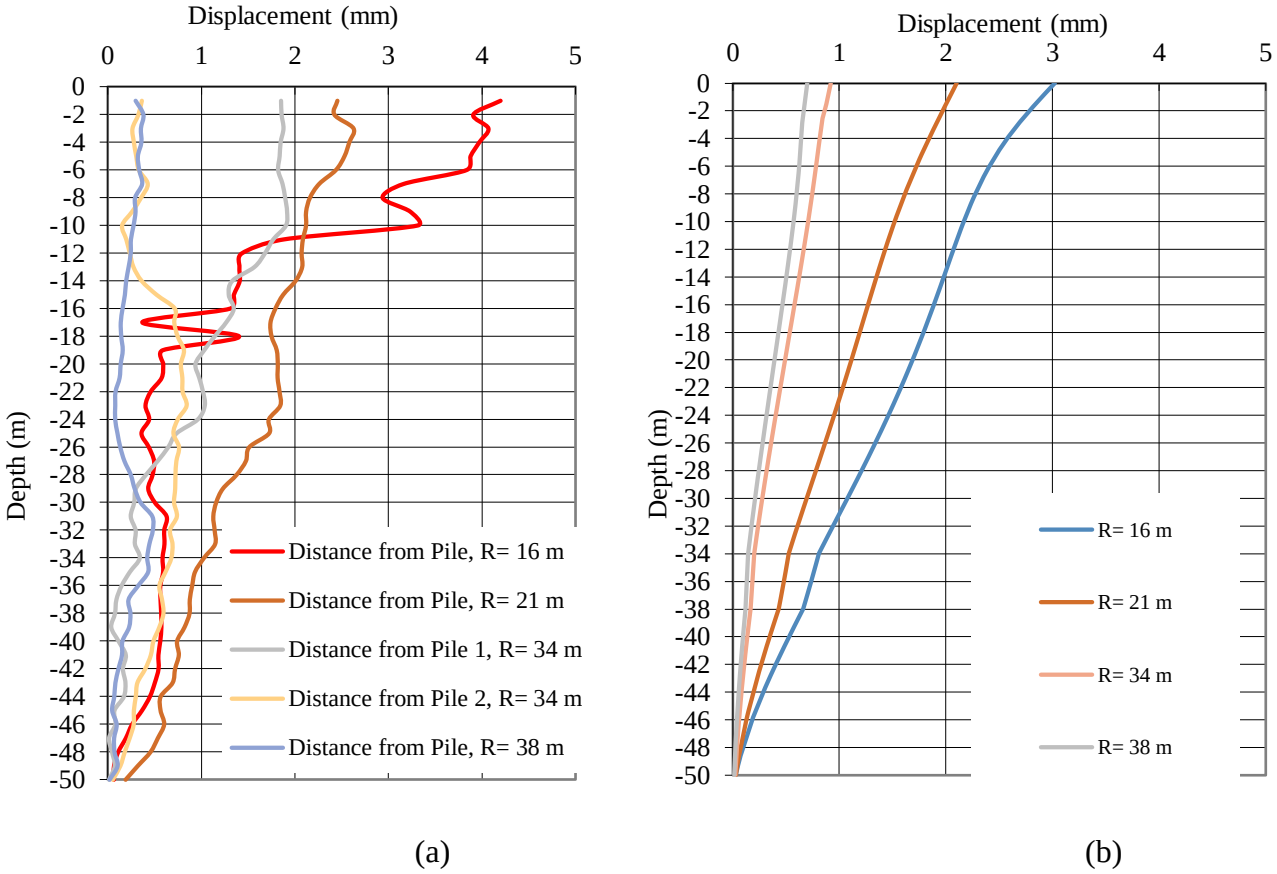


Figure 1. Actual observation result and several lateral soil movement predictions on the surface to the distance divided by the pile length due to 800-mm-diameter pile installation on a construction project

The lateral soil movement that has reduced the *prescribed displacement* to 0.42*r* at the surface and zero at the tip (*linear*) shows a better agreement to the observed result. The examples of the lateral movement result obtained from inclinometer is shown in Fig. 2. The lateral soil

movement results analyzed with PLAXIS 2D are within the range of the maximum and minimum field observation results, and also around the middle of the predicted lateral movement using several formulations.



(a) (b)

Figure 2. (a) Lateral movement results obtained from inclinometer and (b) PLAXIS 2D due to 800-mm-diameter pile installation on a construction project

The impact of the distance, *R*, divided by the pile length, *L*, to the lateral movement in the surface created an observable pattern that indicates when the $R/L > 1$ then the lateral movement will close to 0. The lateral movements on each distance in every project show an observable pattern that indicates the further the distance between the installation and inclinometer, the smaller the lateral movement produced.

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