

# **Sensitivity analysis of pile settlement in clay by changing the geometric parameters of pile and soil resistance**

Ahad Bagherzadeh Khalkhali <sup>1</sup>, Atefeh Al-Sadat Bagheri Bavandpuri \* <sup>2</sup>

1- Islamic Azad University, Science and Research Branch, Civil Engineering Department, Tehran,  
Iran A-bagherzadeh@srbiau.ac.ir

2- Islamic Azad University, Science and Research Branch, Civil Engineering Department, Tehran,  
Iran Atefeh.bagheri@srbiau.ac.i

## **Abstract:**

**In this study, using Plaxis 3D Foundation finite element software, a sample of 4 concrete pile group in clay was modeled based on the modified geotechnical data of Monorail project in Kermanshah. The effect of changes in soil resistance parameters and geometry of the pile on the settlement level has been investigated. Due to the wide range of parameters, sensitivity analysis on the diameter of the pile, soil adhesion and the internal friction angle of the soil have been carried out. In order to investigate the effect of the three parameters studied, by making 5% variations in each parameter from zero to 50%, modeling was carried out, resulting in 30 models of the initial sample. Then, the maximum settlement was obtained from the variations of each parameter and placed in comparative chart. The results show that the changes in the diameter of the pile have the greatest effect on the level of settlement. Afterwards, the changes in the internal friction angle of the soil are effective and, finally, soil adhesion has the least effect. Also, the increase in the diameter of the pile and the internal angle of friction increases the settlement, while the adhesion changes have a reverse effect on the settlement.**

**Key words:** Pile settlement, sensitivity analysis, effective parameters, effect of changes