Ground movements can arise from a large number of sources and can have a significant effect on nearby piles and deep foundations. The main effect of ground movements are the development of additional lateral displacement and bending moments in the piles.

In this research an approach similar to that described in Poulos and Chen (1997) is followed. The main features of the pile response are discussed for three specific problems involving ground movement: piles near strutted wall excavation, piles near cantilever (unstrutted) wall excavation, and piles near earth-fill embankment.

The analyses were made using the finite element program Plaxis. In a first stage, the lateral soil movement is studied for the three problems in the absence of the pile to evaluate the lateral movement pattern. Charts are derived for typical clay soil with different undrained shear strength and at different distances from the source of the lateral movement. In a second stage, key factors influencing the response of a single pile such as excavation depth or embankment height, excavation support condition, soil properties, and pile properties are studied.

A simplified approach similar to that of Poulos and Chen 1997 (developed for strutted and unstrutted all excavation) was adopted for the three stated problems to evaluate the pile response. Based on this approach and the parametric studies, the maximum pile bending moment and lateral deflection are deduced for typical clay soils. For practical applications where lateral soil movement is of concern, the pile response can be evaluated for the different studies problems using simple formulae and a number of design charts.