

Deep Foundations: Analysis of the Lateral Response of Closed Ended Steel Tubular Piles Embedded in Sandy Soil Using P-Y Curves

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Abstract : Understanding the behaviour of the piles under the action of the independent lateral loads and the precise prediction of the capacity of piles subjected to different lateral loads are vital topics in foundation design and analysis. Moreover, the laterally loaded behaviour of deep foundations penetrated in cohesive and non-cohesive soils is basically analysed by the Winkler Model (beam on elastic foundation), in which the interaction between the pile embedded depth and contacted soil is simulated by nonlinear p-y curves. The presence of many approaches to interpret the behaviour of soil-pile interaction has resulted in numerous outputs and indicates that no general approach has yet been adopted. The current study presents the result of numerical modelling of the behaviour of steel tubular piles (25.4mm) outside diameter with various embedment depth-to-diameter ratios (L/d) embedded in a sand calibrated chamber of known relative density. The study revealed that the shear strength parameters of the sand specimens and the (L/d) ratios are the most significant factor influencing the response of the pile and its capacity while taking into consideration the complex interaction between the pile and soil. Good agreement has been achieved when comparing the application of this modelling approach with experimental physical modelling carried out by another researcher.

Keywords : deep foundations, slenderness ratio, soil-pile interaction, winkler model (beam on elastic foundation), non-cohesive soil

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