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Centrifuge Modeling of Monopiles Subjected to Lateral Monotonic Loading

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Abstract : The type of foundation commonly used today for berthing dolphins is a set of tubular steel piles with large diameters, which are known as monopiles. The design of these monopiles is based on the theories related with laterally loaded piles. One of the most common methods to analyze and design the piles subjected to lateral loads is the p-y curves. In the present study, centrifuge tests are conducted in order to obtain the p-y curves. Series of tests were designed in order to investigate the scaling laws in the centrifuge for monotonic loading. Also, two important parameters, the embedded depth L of the pile in the soil and free length e of the pile, as well as their ratios were studied via five experimental tests. Finally, the p-y curves of API are presented to be compared with the curves obtained from the tests so that the differences could be demonstrated. The results show that the p-y curves proposed by API highly overestimate the lateral load bearing capacity. It suggests that these curves need correction and modification for each site as the soil conditions change.

Keywords : centrifuge modeling, monopile, lateral loading, p-y curves
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