Analysis of an extended field test database regarding driven pile ageing in sands

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Abstract

Field testing has revealed that the axial capacities of piles driven in sand can increase dramatically with age after driving. Jardine et al (2006) showed from experiments conducted in Dunkirk that the processes are affected by the history of prior loading and assembled a modest database of field cases to support the evidence from their single test site. This paper reports an extended database that is used to assess: the distinct contributions of base and shaft loads; the potential influence of loading sign (compression or tension); the effects of any prior failures; the influence of groundwater type as well as the effects of pile diameter and material. The analysis presented is informed by parallel highly instrumented model tests that were designed to explore the fundamental driving mechanisms. The findings have important implications for the re-assessment and re-use of foundations in a wide range of onshore and offshore project settings.