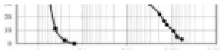
Seyed Alireza Nosrati, Alireza Negahdar & Hasan Negahdar
Original Paper | Published: 27 August 2021 | Article: 1907



ı Journal of Geosciences (2021) 14:1909

ЭINAL PAPER

nparison of plugging impact of open-ended with closed-ended del piles in clayey soils

Jafar Mohammed Al-Waily[1] · Maysa Salem Al-Qaisi[1]

ːd: 12 April 2021 / Accepted: 16 August 2021
di Society for Geosciences 2021

ract
ı, an experimental investigation of the plugging impact on the capacity of open-ended piles installed in clayey soil is ıted. Model tests involving static axial compression load tests are carried out on four open-ended modeled piles with ɛnt diameters (12.5, 19, 25, and 50 mm). In the same manner, four closed-ended modeled piles are tested to make a arison. A load cell system is used to determine the resistance acting on the piles, with an instrumented transducer on the le walls of the pile. The eight steel model piles are tested in the circular steel tank with a diameter of 350 mm and 400 mm in ı. Three undrained shear strengths of the clay sample, 5 KPa, 10 kPa, and 18 kPa, are used in model tests. The outcomes of sted models uncover that the pipe pile capacity is mainly mobilized at the low shear strength. In addition, it is realized that il plugging in the small diameter has an impact on pipe pile capacity. Based on experimental results, five statistical models tablished to achieve relations between the maximum load for the closed-ended pipe. It is realized that the value of Q_{exp} is / correlated with the diameter and $Q_{calc.}$.

ords Plugging · Open ended · Experimental study · Piles · Clayey soil

ɔ ɔn

ı the demand for urban growth grows, so does the avail-/ of land in cities, resulting in higher and heavier struc-ın ever more outlying areas. These structures also need a deal of foundation depth, and the cost-effectiveness of foundations is becoming increasingly appealing with m construction methods (Lee and Salgado 1999).
rt terminals, large offshore bridges, and lifeline networks nong the many projects currently under development in and coastal areas around the world. Steel pipe piles are ılly employed to support large structures and houses, aining structural security while reducing capability. pipe piles are also commonly used in civil engineering ns due to high load bearing capacity, lightweight, and ɔf installation. Large bridges and high-rise buildings need extensive foundations, which are often constructed with large-diameter driven piles (API 2012; Hannigan et al. 2016; Standard 2002).

On the other hand, there are open-ended or closed-ended pipe piles available, and open-ended piles behave differently than closed-ended piles (Szechy 1961; Carter et al. 1980; Randolph et al. 1979; Klos and Tejchman 1977; Smith et al. 1986; Paikowsky and Whitman 1990). In either case, existing steel pipe pile plugging effect design techniques are based on results from model studies or small pile load test diameters. Consequently, when applied to long-distance steel pipe piles, these concepts have limitations (Paikowsky and Whitman 1990). The plugging effect of open-ended piles in various regions, including soil parameters (Kishida 1977; Kraft 1991; Randolph et al. 1991), pile parameters (Klos and Tejchman 1977), and pile setting techniques (Nauroy and Le Tirant 1983; Brucy et al. 1991), is a significant measure of study.

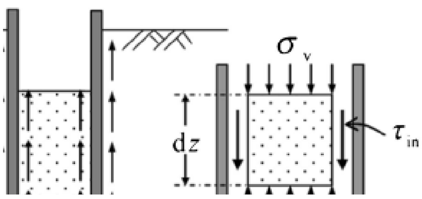
Assuming that each part is independent, Matsumoto et al. (Matsumoto et al. 2007) reported that in static compressive loading, it is generally agreed that the bearing capacity of an open-ended pipe pile is the sum of the outer shaft capacity, Q_{out}; the annular pile base toe capacity, Q_{toe}; and the soil plug capacity, Q_{plug} (Fig. 1). The soil plug capacity, Q_{plug}, is the

ısible Editor: Zeynal Abiddin Erguler

aki Jafar Mohammed Al-Waily

-Furat Al-Awsat Technical UniversityAl Musaib Technical ıllege, Kufa, Iraq

ıed online: 27 August 2021



proving the classical model depiction of a fully plugged pile toe incorrect.

Hussein et al. (Hussein et al. 2016) managed a series of experiments by removing the generated soil plug, which revealed that not only the sleeve height, but also the effective soil plu ıter diamet nts