



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



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شبكة المعلومات الجامعية
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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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BEHAVIOR OF PILE GROUPS UNDER LATERAL LOADS

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ABSTRACT

In pile groups, pile-soil interaction between the piles reduces the pile's lateral resistance. To predict the pile group behavior under lateral loads the p-multiplier approach is commonly used, or the group reduction factors. Different experimental studies have been conducted on pile groups but due to the difficulty and the limited capacity of the loading equipment most of those studies were conducted on small pile groups with free-head condition and small spacing between piles. These drawbacks are the reason for using three-dimensional finite element numerical modeling to study the behavior of pile groups under lateral loads. This research studies the group reduction factor of pile groups with different sizes, spacing, and head conditions. A numerical model is formed to simulate the behavior of pile groups. The reliability of the model is first validated using a full-scale lateral load test on pile group in sand. The established models are used to calculate the group reduction factors of the pile groups. The computed group reduction factors are compared with previous experimental data. This research gives a greater insight of the lateral capacity of the piles in the group based on their row position in the group. The lateral deflection curve and bending moment profile of various piles of different rows are compared. This research finds that the design guidelines overestimated the pile group reduction factor especially for larger pile groups with larger spacing between piles and for pile groups with a fixed head condition such as AASHTO and FEMA P-751.

Keywords: Pile group reduction factor, P-multiplier, Soil-Pile interaction, Deep foundations, lateral loads.

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