

Republic of Iraq
Ministry of Higher
Education and Scientific Research
University of Technology
Building and Construction Engineering Department
Highway and Bridge Engineering Branch



*Experimental and Theoretical Study for Piled Raft
Foundation in Soft Clay*

A Thesis

**Submitted to the Building and Construction Engineering
Department in the University of Technology in Partial
Fulfillment of the Requirements for the Degree of
Master of Science in Geotechnical Engineering**

By

MUDHAFAR KAREEM HAMEEDI

(B.Sc. Civil Engineering, 2005)

Under Supervision of

Prof .Dr .Hussein H. Karim

Asst .Prof. Dr. Mahmoud R.AL.Qaissy

Shawwal 1432

September 2011

01-M-11

ABSTRACT

The piled raft is a geotechnical composite construction consisting of three elements: piles, raft and soil. In the design of piled rafts, the load will be shared between the piles and the raft. Therefore, the piled raft foundation allows an increase in the load capacity and reduction of settlements in a very economic way as compared with the some traditional foundation concepts.

With development of structures by using piled rafts as foundation system, an extensive research work has been performed considering different factors and conditions.

This thesis presents combinations of experimental and numerical studies to investigate the behavior of piled raft system in soils under different conditions. The experimental work included two small scale “prototype” models of different size tested in clayey soil, the load is applied on piled raft foundation by a compression machine. The settlement was measured at the center of the models of single pile, unpiled raft, piled raft with (single, two, three, four) piles and the same provisos groups of piles only

The effect of number of piles, spacing between piles, scale factor on the load carrying capacity of the piled raft system and the load carrying capacity of the piles and raft was studied, and the load-settlement presentation is included.

From a comparison between two models of the experimental work, it is found that the effect of scale factor on carrying load of piled raft increasing when increasing number of piles.

The percentage of the load carried by raft to the total applied load of the experimental model in the case of four piles with raft is 61 % - 66%.

The settlement improvement ratio of both models for experimental work in piled raft (four piles) is about 77%

A numerical modeling is used to verify the same problem of experimental model and analyze two models for the same previous configurations in addition to analyzing two cases of eight piles with raft and sixteen piles with raft for different soil layers, the results show an agreement.

The percentage of the load carried by piles to the total applied load from the numerical model for the case of sixteen piles with raft is 42% - 55%.

The contribution to carry the load of piles relative to the total load decreases with the increase of the spacing to diameter ratio. The percentage of the load carrying for piled raft (two piles) only decreases about 23% for spacing between piles from 3 to 10 diameters of pile.



جمهورية العراق
وزارة التعليم العالي والبحث العلمي
الجامعة التكنولوجية
قسم هندسة البناء والإنشاءات
هندسة الطرق والجسور

دراسه عمليه ونظريه حصيري في الترب الطينيه الضعيفه

إلى قسم هندسة البناء والإنشاءات في الجامعة التكنولوجية
وهي جزء من متطلبات نيل شهادة الماجستير في
هندسة الجيوتكني

مظفر كريم حميدي
بكالوريوس هندسة مدنية 2005

حسين حميد

مود رشيد

ايلول 2011

النسبه المؤيه لقابليه تحملا ز الى الحمل الكلي لحاله ،
ركيزه هي (42 55%).

وتبين من الدراسه أن مقدار مساهمه الركائز في قابليه التحمل الكليه تقل بزياده المسافه بين الركائز
قد وجد في حاله ركيزيتين مع الاساس الحصريي تقل قابليه التحمل لهذه الحاله بمقدار 23%
زياده المسافه بين الر قطر الركيزه.