THE EFFECT OF PARTIAL SKIRT ON THE BEARING CAPACITY OF SQUARE FOOTING ON SAND

To fulfill most of the requirements
to achieve the Bachelor degree of S - 1 Civil Engineering

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STUDY OF CIVIL ENGINEERING
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Surakarta, 18 / Juli 2018

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ABSTRACTS

Bearing capacity is considered as the main factor in designing the foundation of a certain structure and building .This report of our results and experiments try to examine ways to enhance the bearing capacity,

The square skirts that have been used in our lab experiments could show us how much we can enhance the capacity bearing of shallow footing on soil and sand,

Experiments of our research has depended on a steel squared footing with different widths and diameters and with different formulation of water percent and different levels of compaction methods and data.

However, foot skirts tests are very effective and practical way to test and enhance the ultimate bearing capacity of clay ,soil and sand foundations

Keywords: *bearing capacity, square footing, foundation, sand, partial skirt.*

ABSTRAK

Daya dukung dianggap sebagai faktor utama dalam merancang fondasi struktur dan bangunan tertentu. Laporan hasil dan eksperimen ini mencoba untuk menguji cara-cara untuk meningkatkan daya dukung,

Rok persegi yang telah digunakan dalam percobaan laboratorium kami dapat menunjukkan kepada kita seberapa banyak kita dapat meningkatkan kapasitas bantalan pijakan dangkal di tanah dan pasir,

Percobaan dari penelitian kami bergantung pada pijakan baja persegi dengan lebar dan diameter yang berbeda dan dengan formulasi persen air yang berbeda dan tingkat metode pemadatan dan data yang berbeda.

Namun, tes rok kaki sangat efektif dan praktis untuk menguji dan meningkatkan daya dukung utama dari tanah liat, tanah dan pondasi pasir

Kata kunci: daya dukung, pondasi persegi, pondasi, pasir, rok parsial.

1.INTRODUCTION

Bearing capacity is the ability of soil to resist and carry all pressures of any structure and load exert pressure and forces on a certain soil, sand…etc without undergoing a shear failure

Failure can be classified into three modes:

1.1 General shear failure

General shear failure involves total rupture of the underlying soil..

1.2 Local shear failure

Local shear failure can be considered as a transitional phase between general shear and punching shear.

1.3 Punching shear failure

. For punching shear, the soil outside the loaded area remains relatively uninvolved and there is minimal movement of soil on both sides of the footing..

2 METHODOLOGY

The main advantages and goals of our experiments and research to locate the relationship between of settlement of sand and the load on the squared footing with or without skirts.

To implement experiments about behavior of partially skirted footing, we have used small scale models .

2.1 Nine partially skirted footing models which are conducted .

The L/B ratios are:

L/B	B 75 mm	B 100 mm	B 150 mm
L 75 mm	1.00	0.75	0.5
L 100 mm	1.33	1.00	0.66
L 150 mm	2.00	1.5	1.00

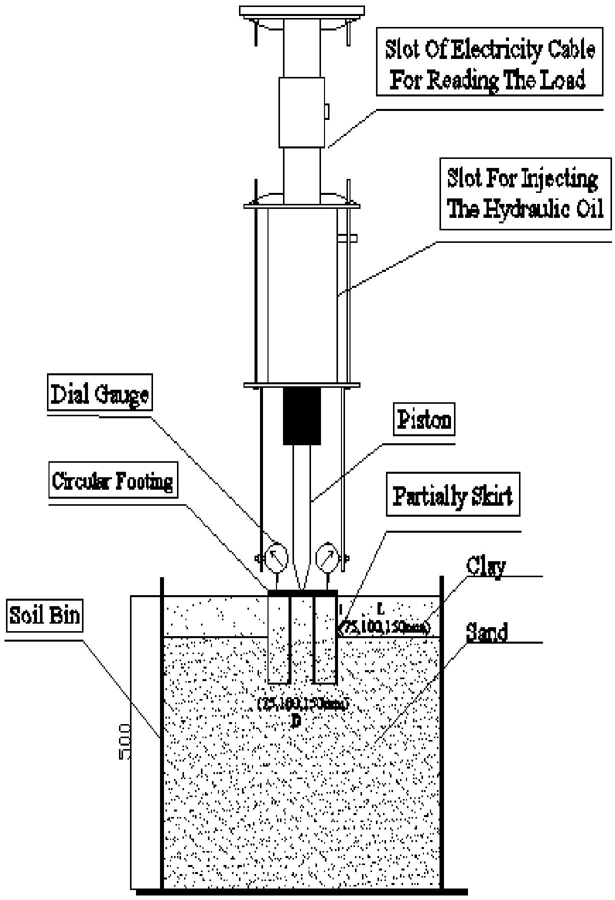


Figure 2 Sketch Setup of Testing Procedures

2.2 Procedures

2.2.1.Prepare and set up the tools and the materials and samples of dried sand that will be used in our experiments .

2.2.2. Investigate the sand that had been dried (at room temperature) from water .

2.2.3. Techniques of the experiment:

First, the sand mixed with 100 ml of water**. Second** layers of sand must have 100 hits for each layer, . **Third,** we set the bin in its place and we start to load it and take video for strain meter and dial gauge

2.2.4 Repeat the above sequences when you replace the foundation with different sizes.

2.2 .5 Analyze all data of the laboratory test result, to get the conclusion of experiments that has been carried out.

3 RESULTS AND DISCUSSION

The skirted and the un skirted tests have to be with same amount of water content and the same technique of compaction..

As shown in Figure V.1-V.3.

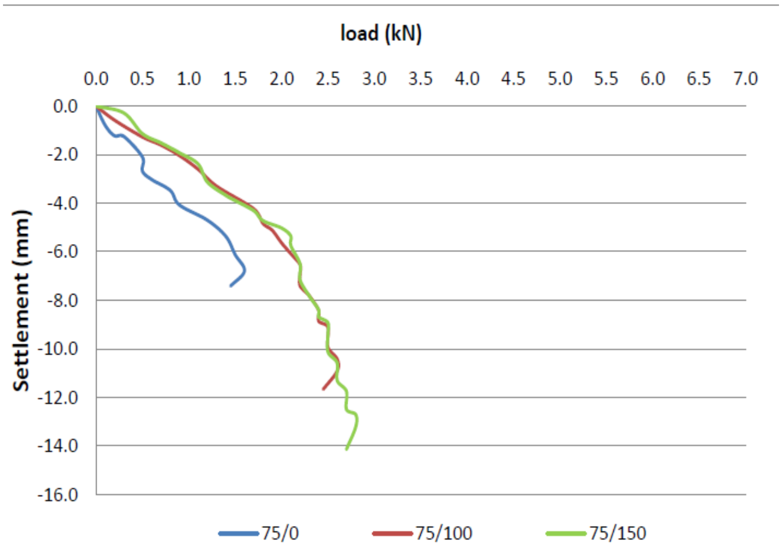


Figure V.1. Load-settlement rrelationship for footing width 75 mm

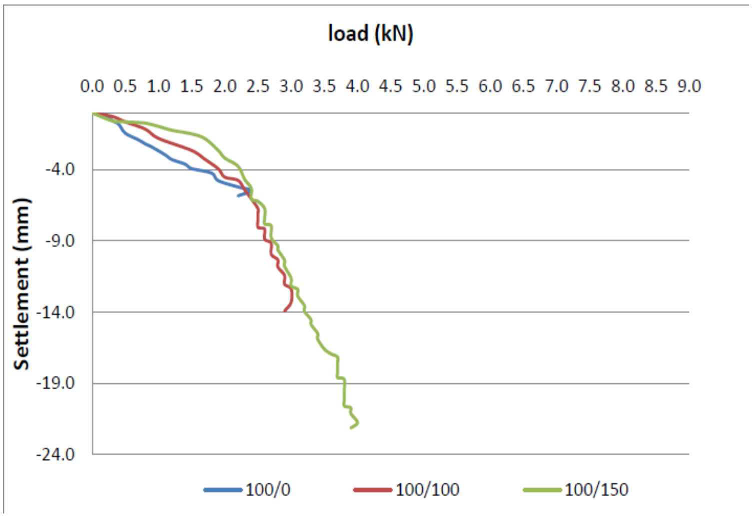


Figure V.2. Load-settlement relationship for footing width 100 mm

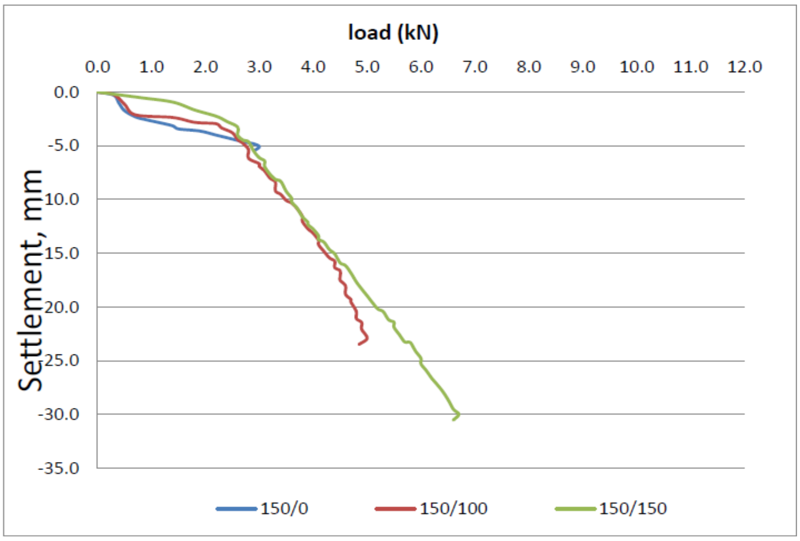


Figure V.3. Load-settlement relationship for footing width 150 mm

According to this graph , as we can see the relationship between the settlement and the load at different length at width 75 mm , as we can see at both length when the Load increase the settlement decrease , in other word if the load is higher the effect at the foundation worst. But as we can see at the graph when the length is bigger the less effect for the foundation, in other word if the length is bigger it can resist the load, so the settlement will be smaller So at this experiment when the length is 150 mm its better choice than the length 100 mm because the settlement is smaller at the length 150 mm than the length 100 mm.

Settlement with Similar Load as a reference

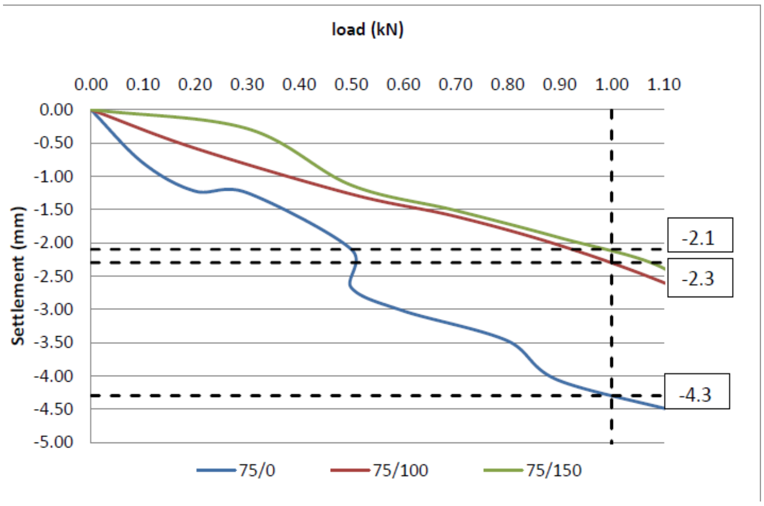


Figure V.6. Ssettlement analysis on footing width 75 mm

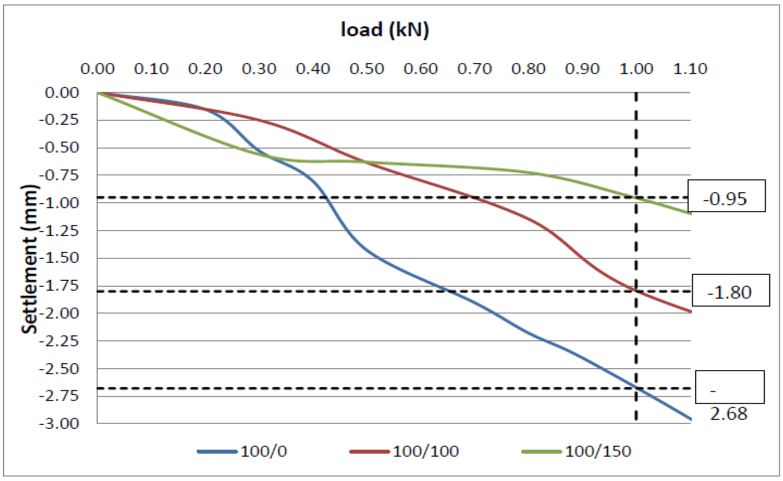


Figure V.7. Ssettlement analysis on footing width 100 mm

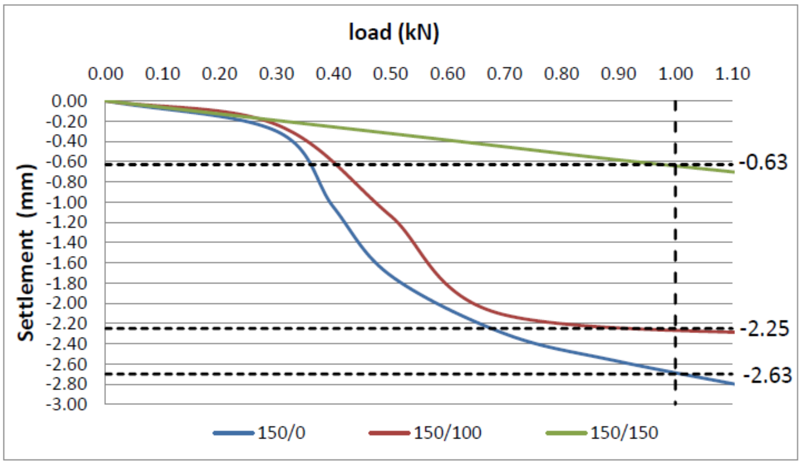


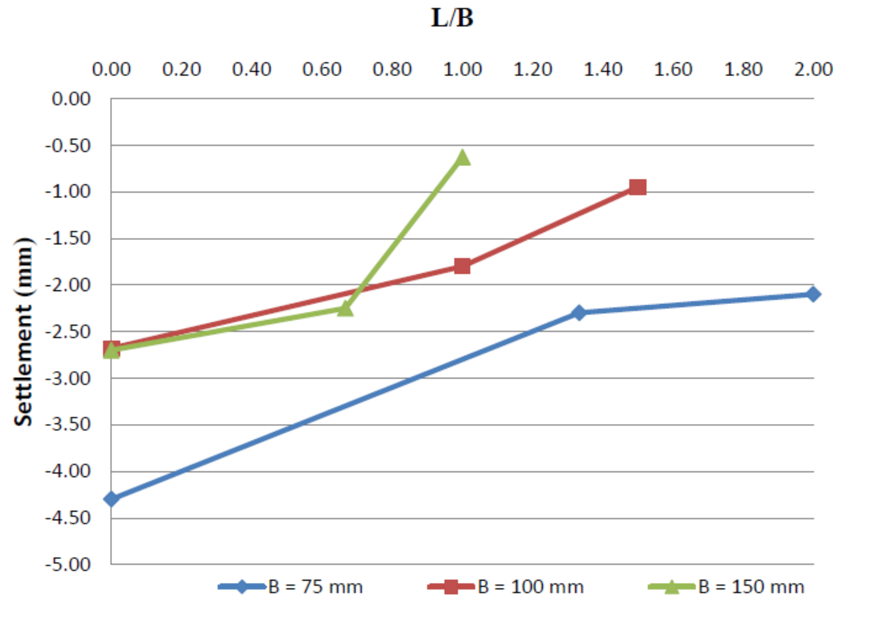
Figure V.8. Ssettlement analysis on footing width 150 mm

From figure 6-8 can be seen the value of the settlement at the same load that is 1.00 KN load. Then in Table V.1. Gives the result of the magnitude of the settlement caused by the length of the different partial skirt at the same width of the footing foundation.

Table 1 Settlement magnitude on load is.1 KN

Footing Width, B (mm)	Skirt Length, L (mm)	L/B	Settlement(S) on 1 kN(mm)
75	0	0.00	-4.30
75	100	1.33	-2.30
75	150	2.00	-2.10
100	0	0.00	-2.68
100	100	1.00	-1.80
100	150	1.50	-0.95
150	0	0.00	-2.70
150	100	0.67	-2.25
150	150	1.00	-0.63

The table 1 also shows the different condition on L/B ratio, which is observed from the similar width and different skirt length, when the L/B ratio increased the settlement decreased. The magnitude of the settlement at 1.00 KN load caused by the length of the skirt indicates that as the length of the skirt lengthens, the value of the settlement becomes smaller.



The relationship between the L/B ratio.

4 CONCLUSIONS

4.1 There are two different results for the effect of partially skirt length to footing width ratio, L/B. when we use the same footings width and changing partially skirt length, the result shows that the ultimate bearing capacity value tend to increase over the initial value. On the other hand, when we use same skirt length and changing the width, the result shows ultimate bearing capacity down unstable.

4.2 The partially skirted that is attached in a square footings improve the bearing capacity of square footings and reduce the impact of settlement, the partially skirted is using less material compared to conventional skirted.

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