Obtaining the Allowable Bearing Capacity From SPT Test

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ABSTRACT

A comparison of standard penetration test methods on bearing capacity analysis of shallow foundations on sand using analytical methods proposed by Peck and Terzaghi, Teng, Meyerhof and Bowles have been carried out. The results showed four limits values of net allowable bearing capacity, for isolated pad foundations placed on sand according to authors, Bowles's method gave higher values followed by the Teng's method, then modified Meyerhof's and lastly by the Peck and Terzagi's method. Generally, allowable bearing capacity showed a decreasing trend as foundation breadth and depth increased. It was shown that the bearing capacity can be found directly from the N-Value in the absence of angle of internal friction (ϕ) and Shear parameters (Cu). Hence, the bearing capacity of various can be investigated.

Keywords : Standard penetration test; Bearing capacity; shear failure; shallow foundation;

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١. INTRODUCTION

١,١ Introductory Remarks

Standard Penetration Test (SPT) is widely used to obtain analysis and design of bearing capacity of soils. In analysis and designing of foundation, there are two basic satisfactory criteria so as to obtain bearing capacity of soils. Bearing capacity and settlement requirements are two basic criteria to be satisfied in the analysis and design of shallow foundations. The criterion on bearing capacity ensures that the foundation does not undergo shear failure under loading, while settlement requirement ensures that settlement of the structure is within the tolerance limit of the superstructure. Three types of shear failures have been identified to occur under foundation induced loading, general shear failure, punching shear failure and local shear failure. Details of these failures and their mechanisms have been reported by (Caquot, ١٩٣٤, Terzaghi, ١٩٤٣, De Beer and Vesic, ١٩٥٨, Vesic, ١٩٦٧). The use of standard penetration test in the analysis of bearing capacity and settlement has also received numerous attentions (Craig, ١٩٨٧, Ambily and Gandhi, ٢٠٠٧, Das and Sobhan, ٢٠١٣, Tomlinson and Boorman, ٢٠٠١). Details of the field application of Standard Penetration Test are specified in BS ١٣٧٧ and ASTM D١٥٨٦-١١. This study attempts to report on bearing capacity and assuming settlement in the allowable range with ٢٥mm of shallow foundations methods based on the standard penetration test.

١.٢ Aims and Objectives

The aim of this study is to determine the allowable bearing capacity from standard penetration test (SPT) according to empirical equation from some authors and comparing the result between each author with respect of depth and width of foundation taking N value as the main factors the variation of SPT are varied from ١٢-٤٤ blows, then comparing each author with respect to variation of width and depth of foundation with the same SPT value. Assuming settlement in the allowable range ٢٤,٥ mm. Finally, graphs are drawn for each relation so as to know which author is near the others.

١,٣ Outline of the Study

Several steps are performed; first of all, collecting data from soil investigations of Halabja university and Samara university in order to know SPT value of them, next step from the empirical equations calculated the bearing capacity by changing variables such as width, depth of foundation and SPT value. Finally, plotted (scatter plot) the relationship to know the effect of variable parameters. The results obtained from the above procedures will be discussed thoroughly. Tables (١ to ٦) summarized the results of the allowable bearing capacity.

١,٤ Bearing capacity

The bearing capacity is a criterion for structural stability. Any structure, unless it floats, must eventually be founded on soil. The failure criterion for foundation soil is known as the ultimate bearing capacity or simply the bearing capacity of soil and is considered as one of the corner stones of soil mechanics. For such a purpose, scientists from about many decades ago tried to establish sound bearing capacity equations, which take into account the most variables encountered. Nowadays, the available bearing capacity equations are "how we say" numerous. Some of them have succeeded to float on surface while others have not. By bearing capacity equations, here, authors mean, as well, all techniques used in field and laboratory to "estimate" the ultimate bearing stress of soil. Most of the field data available are presented as tables with boundary limits or monographs in terms of well standard tests such as the SPT (standard penetration test).

٢. Materials and methods

٢,١. Bearing capacity analysis

A bearing capacity analysis for isolated pad foundation placed on sand was carried out on soil stratigraphy generally consisting of loose, silty to slightly silty sand, overlying medium-dense, slightly silty SAND formation. In computing bearing capacity, an average SPT value of ١٣ which was obtained up to depth B below the footing; where B is breadth of foundation was used. Subsurface information was achieved through borings to ١٤ meters depth below ground level. The proposed isolated pad foundations were to be placed one meter below the sand formation Bearing capacity is analyzed for foundation breadth B, varying from ٢,٥٠-٩,٠ m and placed at foundation depths varying from ١,٠-٢,٥m.

٢,٢. Analytical methods

The following in-situ SPT methods were adopted in evaluating bearing capacity of shallow foundations placed on sand;

The ultimate bearing capacity of shallow foundation placed on sand is given by the following expression;

٢,٢,١. Peck and Terzaghi, (١٩٤٨) modified method

According to Peck and Terzaghi theory, an estimated maximum foundation settlement of ٢٥,٤mm is allowed and the net allowable bearing capacity is given by the expression;

$$q_s = 35(N_{cor} - 3)\left(\frac{B+0.3}{2B}\right)^2 R_{w2} F_d \text{ kN/m}^2$$

Where:

q_s - Net allowable bearing pressure for a settlement of ٢٤,٥ mm in kN/m٢

N_{cor} = corrected standard penetration value (N٦٠)

$R_{w٢}$ = water table correction factor.

F_d = depth factor = (١ + D_f / B) < ٢,٠

B = width of footing in meters, D_f= depth of foundation in meters

٢,٢.٢. Teng's modified equation

The equation proposed by Meyerhof and Teng were found to be very conservative. The equations proposed are Teng's modified equation;

$$q_s = 53\,(N_{cor} - 3)\left(\frac{B + 0.3}{2B}\right)^2 R_{w2} F_d$$

Where:

q_s - Net allowable bearing pressure for a settlement of ٢٤,٥ mm in kN/m٢

N_{cor} = corrected standard penetration value (N٦٠)

$R_{w٢}$ = water table correction factor.

F_d = depth factor = (١ + D_f / B) < ٢,٠

B = width of footing in meters

D_f= depth of foundation in meters

٢,٢,٣. Modified Meyerhof (١٩٥٦) method

The modified Meyerhof (١٩٥٦) correlation for bearing capacity using Standard Penetration Resistance is presented by Bowles (١٩٩٧) for an allowable settlement of ٢٥,٤mm as follows;

$$q_s = 20\, N_{cor} R_{w2} F_d \text{ for } B \leq 1.2 \text{ m}$$

$$q_s = 12.5 N_{cor}\left(\frac{B + 0.3}{B}\right)^2 R_{w2} F_d \text{ for } B > 1.2 \text{ m}$$

Where:

q_s - Net allowable bearing pressure for a settlement of ٢٤,٥ mm in kN/m٢,

N_{cor} = corrected standard penetration value (N٦٠)

$R_{w٢}$ = water table correction factor.

F_d = depth factor =١ +٠,٣٣(D_f / B) <= ١,٣٣

B = width of footing in meters,

D_f= depth of foundation in meters

٢,٢,٤. Bowles (١٩٧٧) method

$$q_{\text{all(net)}}(\text{kN/m}^2) = 19.16 N_{\text{cor}} F_d \left(\frac{S_e}{25} \right) \qquad (\text{for } B \leq 1.22 \text{ m})$$

$$q_{\text{all(net)}}(\text{kN/m}^2) = 11.98 N_{\text{cor}} \left(\frac{3.28B + 1}{3.28B} \right)^2 F_d \left(\frac{S_e}{25} \right) \qquad (\text{for } B > 1.22 \text{ m})$$

Where:

q_{all} - Net allowable bearing pressure, kN/m^{٢}

N_{cor} = corrected standard penetration value (N٦٠).

F_d = depth factor =١ +٠,٣٣(D_f / B) <= ١,٣٣

B = width of footing in meters

Se=   Settlement (mm)

Table 2. 1: Represent variation of width of foundation with constant SPT, Df=1.0m

B	Df	Rw	Fd = depth factor = (١ + D_f / B) < ٢,٠	Fd = depth factor = (١ + ٠,٣٣(D_f / B)) <= ٠,٣٣	N٦٠	(Peck & Terzaghi, ١٩٤٨) ,kN/m٢	Teng's equation ,kN/m٢	Meyerhof 's equation (modified) ,kN/m٢	Bowel's equation, kN/m٢
٢,٥	١	٠,٥	١,٤٠	١,١٣	١٣	٧٦,٨٣	١١٦,٣٥	١١٥,٣٧	٢٢١,٩٢
٣	١	٠,٥	١,٣٣	١,١١	١٣	٧٠,٥٨	١٠٦,٨٨	١٠٩,١٣	٢٠٩,٧٩
٣,٥	١	٠,٥	١,٢٩	١,٠٩	١٣	٦٦,٣١	١٠٠,٤١	١٠٤,٨١	٢٠١,٤١
٤	١	٠,٥	١,٢٥	١,٠٨	١٣	٦٣,٢٠	٩٥,٧٠	١٠١,٦٤	١٩٥,٢٧
٤,٥	١	٠,٥	١,٢٢	١,٠٧	١٣	٦٠,٨٤	٩٢,١٣	٩٩,٢٢	١٩٠,٥٨
٥	١	٠,٥	١,٢٠	١,٠٧	١٣	٥٨,٩٩	٨٩,٣٣	٩٧,٣٢	١٨٦,٨٨
٥,٥	١	٠,٥	١,١٨	١,٠٦	١٣	٥٧,٥٠	٨٧,٠٧	٩٥,٧٨	١٨٣,٨٩
٦	١	٠,٥	١,١٧	١,٠٦	١٣	٥٦,٢٧	٨٥,٢١	٩٤,٥٠	١٨١,٤٣
٦,٥	١	٠,٥	١,١٥	١,٠٥	١٣	٥٥,٢٥	٨٣,٦٦	٩٣,٤٤	١٧٩,٣٦
٧	١	٠,٥	١,١٤	١,٠٥	١٣	٥٤,٣٨	٨٢,٣٤	٩٢,٥٣	١٧٧,٦٠
٧,٥	١	٠,٥	١,١٣	١,٠٤	١٣	٥٣,٦٣	٨١,٢١	٩١,٧٥	١٧٦,٠٨
٨	١	٠,٥	١,١٣	١,٠٤	١٣	٥٢,٩٨	٨٠,٢٣	٩١,٠٧	١٧٤,٧٦
٨,٥	١	٠,٥	١,١٢	١,٠٤	١٣	٥٢,٤١	٧٩,٣٦	٩٠,٤٧	١٧٣,٦٠
٩	١	٠,٥	١,١١	١,٠٤	١٣	٥١,٩١	٧٨,٦٠	٨٩,٩٤	١٧٢,٥٧

Table 2. 2: Represent variation of width of foundation with constant SPT, Df=1.50m

B	Df	Rw	Fd = depth factor = (١ + D_f / B) < ٢,٠	Fd = depth factor = (١ + ٠,٣٣(D_f / B)) <= ١.٣٣	N٦٠	(Peck & Terzaghi, ١٩٤٨) ,kN/m٢	Teng’s equation ,kN/m٢	Meyerhof 's equation (modified) ,kN/m٢	Bowel’s equation, kN/m٢
٢,٥	١,٥	٠,٥	١,٦٠	١,٢٠	١٣	٨٧,٨١	١٣٢,٩٧	١٢٢,١٠	٢٣٤,٨٦
٣	١,٥	٠,٥	١,٥٠	١,١٧	١٣	٧٩,٤١	١٢٠,٢٤	١١٤,٥٣	٢٢٠,١٩
٣,٥	١,٥	٠,٥	١,٤٣	١,١٤	١٣	٧٣,٦٧	١١١,٥٦	١٠٩,٣٢	٢١٠,٠٨
٤	١,٥	٠,٥	١,٣٨	١,١٢	١٣	٦٩,٥٢	١٠٥,٢٧	١٠٥,٥١	٢٠٢,٧١
٤,٥	١,٥	٠,٥	١,٣٣	١,١١	١٣	٦٦,٣٧	١٠٠,٥٠	١٠٢,٦١	١٩٧,٠٩
٥	١,٥	٠,٥	١,٣٠	١,١٠	١٣	٦٣,٩٠	٩٦,٧٧	١٠٠,٣٣	١٩٢,٦٧
٥,٥	١,٥	٠,٥	١,٢٧	١,٠٩	١٣	٦١,٩٢	٩٣,٧٧	٩٨,٤٩	١٨٩,١٠
٦	١,٥	٠,٥	١,٢٥	١,٠٨	١٣	٦٠,٢٩	٩١,٣٠	٩٦,٩٧	١٨٦,١٦
٦,٥	١,٥	٠,٥	١,٢٣	١,٠٨	١٣	٥٨,٩٣	٨٩,٢٤	٩٥,٦٩	١٨٣,٦٩
٧	١,٥	٠,٥	١,٢١	١,٠٧	١٣	٥٧,٧٨	٨٧,٤٩	٩٤,٦١	١٨١,٥٩
٧,٥	١,٥	٠,٥	١,٢٠	١,٠٧	١٣	٥٦,٧٨	٨٥,٩٩	٩٣,٦٨	١٧٩,٧٩
٨	١,٥	٠,٥	١,١٩	١,٠٦	١٣	٥٥,٩٢	٨٤,٦٨	٩٢,٨٧	١٧٨,٢٢
٨,٥	١,٥	٠,٥	١,١٨	١,٠٦	١٣	٥٥,١٧	٨٣,٥٤	٩٢,١٦	١٧٦,٨٤
٩	١,٥	٠,٥	١,١٧	١,٠٦	١٣	٥٤,٥٠	٨٢,٥٣	٩١,٥٣	١٧٥,٦٣

Table 2. 3: Represent variation of width of foundation with constant SPT, Df=2.00m

B	Df	Rw	Fd = depth factor = (١ + D_f / B) < ٢,٠	Fd = depth factor = (١ + ٠,٣٣(D_f / B)) <= ١.٣٣	N٦٠	(Peck & Terzaghi, ١٩٤٨) ,kN/m^{٢}	Teng's equation ,kN/m^{٢}	Meyerhof 's equation (modified) ,kN/m^{٢}	Bowel's equation, kN/m^{٢}
٢,٥	٢	٠,٥	١,٨٠	١,٢٦	١٣	٩٨,٧٨	١٤٩,٥٩	١٢٨,٨٣	٢٤٧,٨٠
٣	٢	٠,٥	١,٦٧	١,٢٢	١٣	٨٨,٢٣	١٣٣,٦٠	١١٩,٩٤	٢٣٠,٥٨
٣,٥	٢	٠,٥	١,٥٧	١,١٩	١٣	٨١,٠٤	١٢٢,٧٢	١١٣,٨٤	٢١٨,٧٦
٤	٢	٠,٥	١,٥٠	١,١٧	١٣	٧٥,٨٤	١١٤,٨٤	١٠٩,٣٩	٢١٠,١٥
٤,٥	٢	٠,٥	١,٤٤	١,١٥	١٣	٧١,٩٠	١٠٨,٨٨	١٠٦,٠٠	٢٠٣,٦٠
٥	٢	٠,٥	١,٤٠	١,١٣	١٣	٦٨,٨٢	١٠٤,٢١	١٠٣,٣٤	١٩٨,٤٥
٥,٥	٢	٠,٥	١,٣٦	١,١٢	١٣	٦٦,٣٤	١٠٠,٤٧	١٠١,٢٠	١٩٤,٣٠
٦	٢	٠,٥	١,٣٣	١,١١	١٣	٦٤,٣١	٩٧,٣٩	٩٩,٤٣	١٩٠,٨٩
٦,٥	٢	٠,٥	١,٣١	١,١٠	١٣	٦٢,٦١	٩٤,٨٢	٩٧,٩٥	١٨٨,٠٢
٧	٢	٠,٥	١,٢٩	١,٠٩	١٣	٦١,١٧	٩٢,٦٤	٩٦,٦٩	١٨٥,٥٩
٧,٥	٢	٠,٥	١,٢٧	١,٠٩	١٣	٥٩,٩٤	٩٠,٧٦	٩٥,٦١	١٨٣,٥٠
٨	٢	٠,٥	١,٢٥	١,٠٨	١٣	٥٨,٨٧	٨٩,١٤	٩٤,٦٧	١٨١,٦٨
٨,٥	٢	٠,٥	١,٢٤	١,٠٨	١٣	٥٧,٩٣	٨٧,٧٢	٩٣,٨٥	١٨٠,٠٩
٩	٢	٠,٥	١,٢٢	١,٠٧	١٣	٥٧,١٠	٨٦,٤٦	٩٣,١٢	١٧٨,٦٨

Table 2. 4: Represent variation of width of foundation with constant SPT, Df=2.50m

B	Df	Rw	Fd = depth factor = (١ + D_f / B) < ٢,٠	Fd = depth factor = (١ + ٠,٣٣(D_f / B)) <= ١.٣٣	N٦٠	(Peck & Terzaghi, ١٩٤٨) ,kN/m٢	Teng's equation ,kN/m٢	Meyerhof 's equation (modified) ,kN/m٢	Bowel's equation, kN/m٢
٢,٥	٢,٥	٠,٥	٢,٠٠	١,٣٣	١٣	١٠٩,٧٦	١٦٦,٢١	١٣٥,٥٥	٢٦٠,٧٤
٣	٢,٥	٠,٥	١,٨٣	١,٢٨	١٣	٩٧,٠٥	١٤٦,٩٦	١٢٥,٣٥	٢٤٠,٩٨
٣,٥	٢,٥	٠,٥	١,٧١	١,٢٤	١٣	٨٨,٤١	١٣٣,٨٨	١١٨,٣٥	٢٢٧,٤٤
٤	٢,٥	٠,٥	١,٦٣	١,٢١	١٣	٨٢,١٦	١٢٤,٤١	١١٣,٢٦	٢١٧,٥٩
٤,٥	٢,٥	٠,٥	١,٥٦	١,١٨	١٣	٧٧,٤٣	١١٧,٢٥	١٠٩,٣٩	٢١٠,١١
٥	٢,٥	٠,٥	١,٥٠	١,١٧	١٣	٧٣,٧٤	١١١,٦٦	١٠٦,٣٦	٢٠٤,٢٤
٥,٥	٢,٥	٠,٥	١,٤٥	١,١٥	١٣	٧٠,٧٧	١٠٧,١٦	١٠٣,٩١	١٩٩,٥١
٦	٢,٥	٠,٥	١,٤٢	١,١٤	١٣	٦٨,٣٣	١٠٣,٤٧	١٠١,٩٠	١٩٥,٦٢
٦,٥	٢,٥	٠,٥	١,٣٨	١,١٣	١٣	٦٦,٣٠	١٠٠,٣٩	١٠٠,٢١	١٩٢,٣٦
٧	٢,٥	٠,٥	١,٣٦	١,١٢	١٣	٦٤,٥٧	٩٧,٧٨	٩٨,٧٨	١٨٩,٥٩
٧,٥	٢,٥	٠,٥	١,٣٣	١,١١	١٣	٦٣,٠٩	٩٥,٥٤	٩٧,٥٥	١٨٧,٢١
٨	٢,٥	٠,٥	١,٣١	١,١٠	١٣	٦١,٨١	٩٣,٦٠	٩٦,٤٨	١٨٥,١٤
٨,٥	٢,٥	٠,٥	١,٢٩	١,١٠	١٣	٦٠,٦٨	٩١,٨٩	٩٥,٥٤	١٨٣,٣٣
٩	٢,٥	٠,٥	١,٢٨	١,٠٩	١٣	٥٩,٦٩	٩٠,٣٩	٩٤,٧١	١٨١,٧٣

Table 2. 5: Represent variation of SPT with constant of foundation width, Df=1.0m

B	Df	Rw	Fd = depth factor = (١ + D_f / B) < ٢,٠	Fd = depth factor = (١ + ٠,٣٣(D_f / B)) <= ١.٣٣	N٦٠	(Peck & Terzaghi, ١٩٤٨) ,kN/m^{٢}	Teng’s equation ,kN/m^{٢}	Meyerhof 's equation (modified) ,kN/m^{٢}	Bowel’s equation, kN/m^{٢}
٣	١	٠,٥	١,٣٣	١,١١	١٥	٨٤,٧٠	١٢٨,٢٦	١٢٥,٩٢	٢٤٢,٠٧
٣	١	٠,٥	١,٣٣	١,١١	١٧	٩٨,٨٢	١٤٩,٦٤	١٤٢,٧٠	٢٧٤,٣٥
٣	١	٠,٥	١,٣٣	١,١١	١٩	١١٢,٩٣	١٧١,٠١	١٥٩,٤٩	٣٠٦,٦٢
٣	١	٠,٥	١,٣٣	١,١١	٢١	١٢٧,٠٥	١٩٢,٣٩	١٧٦,٢٨	٣٣٨,٩٠
٣	١	٠,٥	١,٣٣	١,١١	٢٣	١٤١,١٧	٢١٣,٧٧	١٩٣,٠٧	٣٧١,١٧
٣	١	٠,٥	١,٣٣	١,١١	٢٥	١٥٥,٢٨	٢٣٥,١٤	٢٠٩,٨٦	٤٠٣,٤٥
٣	١	٠,٥	١,٣٣	١,١١	٢٧	١٦٩,٤٠	٢٥٦,٥٢	٢٢٦,٦٥	٤٣٥,٧٢
٣	١	٠,٥	١,٣٣	١,١١	٢٩	١٨٣,٥٢	٢٧٧,٩٠	٢٤٣,٤٤	٤٦٨,٠٠
٣	١	٠,٥	١,٣٣	١,١١	٣١	١٩٧,٦٣	٢٩٩,٢٧	٢٦٠,٢٣	٥٠٠,٢٨
٣	١	٠,٥	١,٣٣	١,١١	٣٣	٢١١,٧٥	٣٢٠,٦٥	٢٧٧,٠١	٥٣٢,٥٥
٣	١	٠,٥	١,٣٣	١,١١	٣٥	٢٢٥,٨٧	٣٤٢,٠٣	٢٩٣,٨٠	٥٦٤,٨٣
٣	١	٠,٥	١,٣٣	١,١١	٣٧	٢٣٩,٩٨	٣٦٣,٤٠	٣١٠,٥٩	٥٩٧,١٠
٣	١	٠,٥	١,٣٣	١,١١	٣٩	٢٥٤,١٠	٣٨٤,٧٨	٣٢٧,٣٨	٦٢٩,٣٨
٣	١	٠,٥	١,٣٣	١,١١	٤١	٢٦٨,٢٢	٤٠٦,١٦	٣٤٤,١٧	٦٦١,٦٦

٣. Results and discussions

The results of net allowable bearing capacity, qn(a), of shallow foundations on sand based on Peck and Terzaghi, Teng's modified, Modified Meyerhof and Bowle's method Standard penetration test models for footing width, B, and Df varying from (١,٠ – ٢,٥٠) m are depicted in Figs. ١- ٤. Generally, qn(a) showed an increasing of footing width lead to decreasing qn and qn increase with depth increased .At Df = ١,٠m and foundation breadth, B, varying from ٢,٥ – ٩,٠m, the net allowable capacity qn(a) ranged from ٧٦- ٥١kN/m٢ respectively for Peck and Terzaghi model. The Teng's modified model had qn(a) values ranging from ١١٦ - ٧٨kN/m٢ for B ranging from ٢,٥ - ٩,٠m respectively. The modified Meyerhof model had a range of bearing capacity from١١٥-٨٩ kN/m٢ correspondingly with variations of footing width B from ٢,٥ - ٩,٠m respectively. At D_f = ١,٠m and foundation breadth, B, varying from ٢,٥ – ٩,٠m, the net allowable capacity qn(a) ranged from ٢٢١- ١٧٩ kN/m٢ respectively for Bowle's model. Similarly, Peck and Terzaghi's model had qn(a) values ranging from ١٠٩ - ٥٩kN/m٢ for same range of foundation breadth respectively. At Df = ٢,٥, the qn(a) for Teng's model had same values ranging from ١٦٦ – ٩٠ kN/m٢ but results of the modified Meyerhof model had qn(a) varying from ١٣٣ - ٩٤kN/m٢ while bowle's model had qn(a) ranging from ٢٦٠ – ١٨١ kN/m٢ for B varying from ٢,٥ – ٩,٠m respectively. As D_f increases, the values of qn for all authors model were increased dramatically because when D_f increase shear resistance increased. similarly, when B increased the allowable bearing capacity decreased because of the effect of settlement of footing. It can be seen from Fig. 5 for the same width and depth of footing increase in N value dramatically increased allowable bearing capacity for mentioned authors.

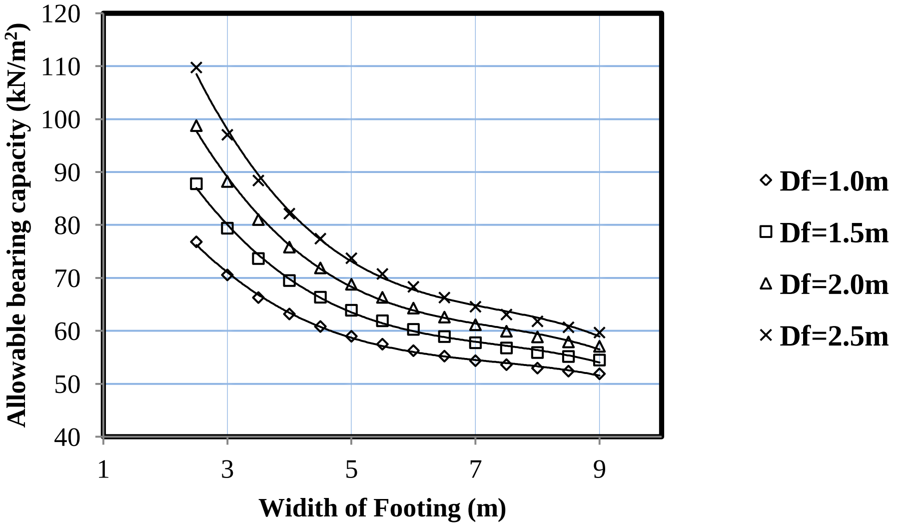

Fig. 1 Variation of Pad foundation breadth vs Allowable bearing capacity Peck and Terzaghi's model

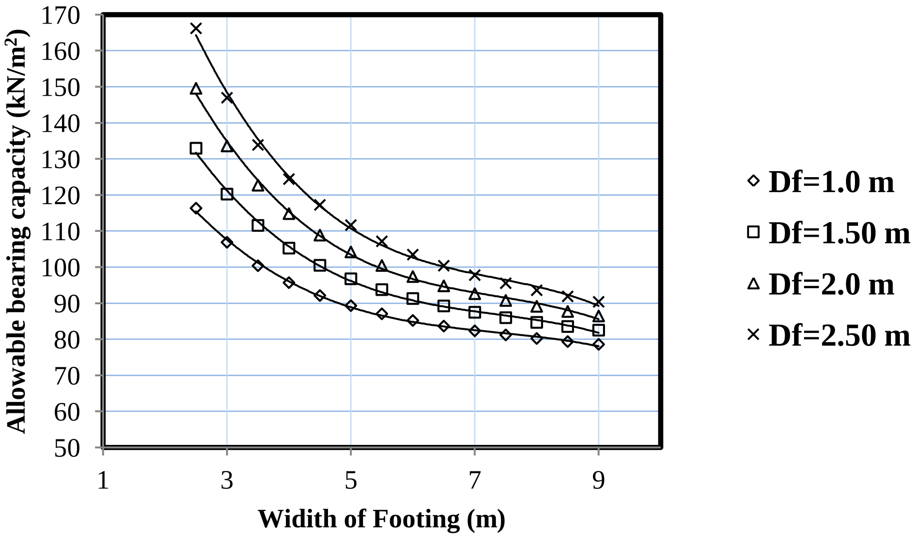

Fig. 2 Variation of Pad foundation breadth vs Allowable bearing Teng's model

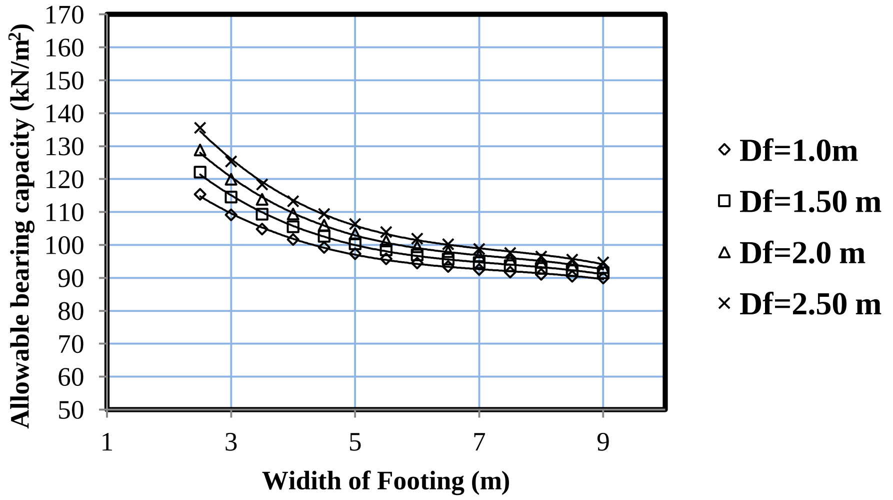

Fig. 3 Variation of Pad foundation breadth vs Allowable bearing Meyerhof's model

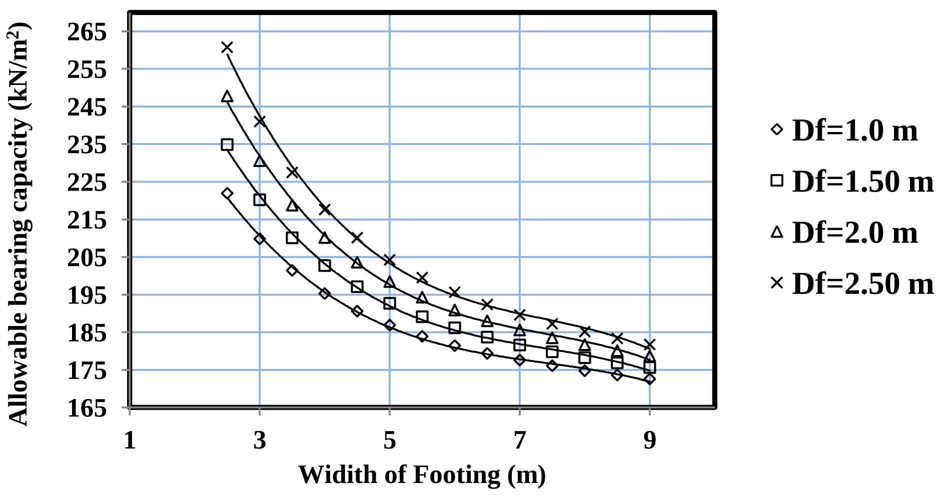

Fig. 4 Variation of Pad foundation breadth vs Allowable bearing Bowles model

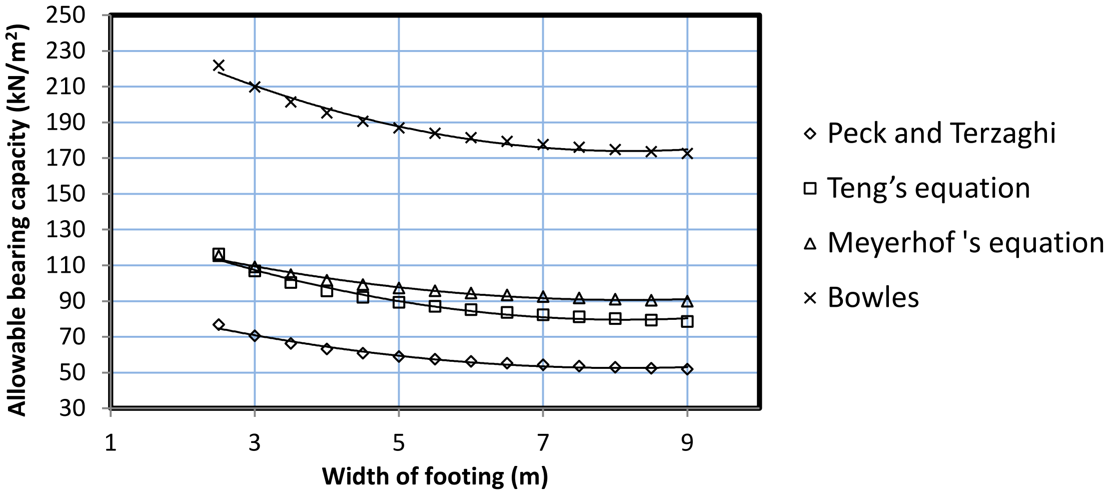

Fig. 5 Variation of Pad foundation breadth and allowable bearing capacity at Df=1.0m.

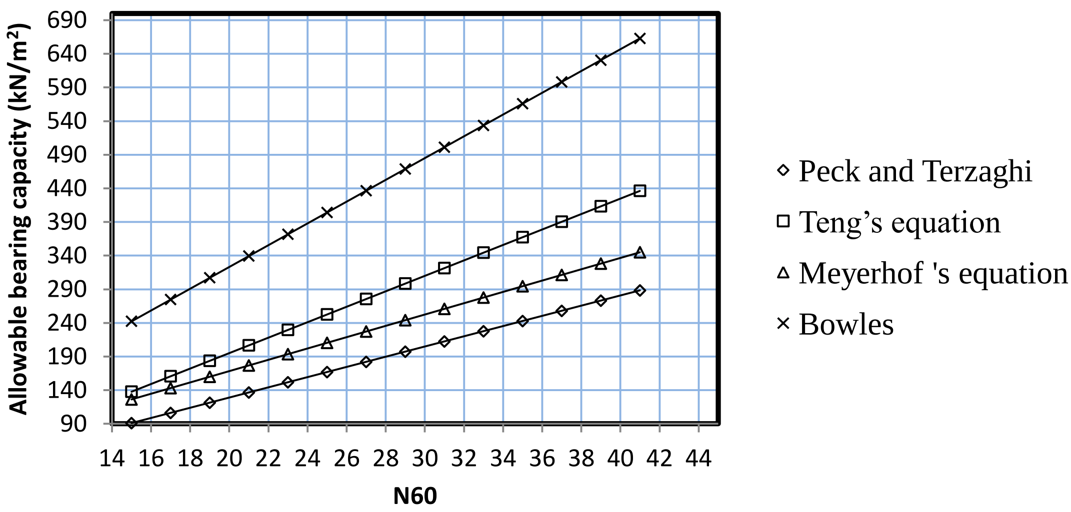

Fig. 6 Variation of N value vs allowable bearing capacity

٤. Conclusions:

In this Study, the effect of standard penetration test for obtaining allowable bearing capacity was conducted. Based on experimental and analytical data from soil investigation report, the following conclusion was reached.

١. Foundation depth (D_f) had influential effect on allowable bearing capacity. Increasing footing width lead to decreasing allowable bearing capacity. whereas, for the same footing width the allowable bearing capacity increasing with increasing (D_f).

٢. Decreasing the footing depth ratio (D_f) to footing width ratio (B) (Df/B) resulted in decreasing allowable bearing capacity.

٣. Water table location had a great impact to obtain allowable bearing capacity when water table with base footing level the value of Rw change to ٠,٥ this lead to decreasing allowable bearing capacity

٤. Water table level had no effect to obtain allowable bearing capacity when width of footing greater than depth of water table

٥. In all cases of D_f and B, Bowles model had higher allowable bearing capacity compared to the other models.

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