

List of Symbols

The following are some of the more frequently used symbols in this thesis. Symbols used infrequently are not included in the list.

English letters

A_b	Cross-section area of the pile, m^2 .
A_s	Surface area of the pile, m^2 .
c_u	Undrained cohesion, kN/m^2 .
D	Pile perimeter, m.
d_f	Foundation depth, m.
E_s	Modulus of elasticity for loading, kN/m^2 .
E_b	<i>Young's</i> modulus, kN/m^2 .
G	Shear modulus, kN/m^2 .
L_c	Critical pile length, m.
l	Pile length, m.
m_x	Bending moment in x -direction, $kN.m/m$.
m_y	Bending moment in y -direction, $kN.m/m$.
N_c	Bearing capacity factor, -.
Q_u	Ultimate load of the pile, kN.
Q_b	End bearing capacity, kN.
Q_s	Surface capacity, kN.
Q_x	Shear force in x -direction, kN/m .
Q_y	Shear force in y -direction, kN/m .
Ql	Limit pile load, kN.
Ql	Limit pile load, kN.
Q_{all}	Allowable pile load, kN.
ql	Limit shaft friction, kN/m^2 .
qs	Skin friction around the pile, kN/m^2 .
qb	End bearing capacity, kN/m^2 .
q	Contact pressure, kN/m^2 .

P_p	Pile force, kN.
PI	Plastic Index
LL	Liquid limit
PL	Plastic limit
S	Settlement, m.
S_{sp}	Settlement in a single pile, m.
S_g	Settlement of pile in the group, m.
r_{ga}	Group action ratio, %.
W_s	Modulus of elasticity for reloading, kN/m ² .
z	Depth measured from the clay surface, m.

Greek letters

α	Adhesion factor, -.
α_{kpp}	Bearing factor, %.
γ_b	Unit weight, kN/m ³ .
Δs	Max. differential settlement, %.
ν_s	<i>Poisson's</i> ratio of the soil, -.
ν_b	<i>Poisson's</i> ratio, -.
φ	Pile diameter, m.

List of Abbreviations

ABAQUS	Program for 3D finite element model
ASTM	American Society for Testing and Materials
BEM	Boundary element method
DEFPIG	Program for analyzing deep foundations
DIN	German code
ECP	Egyptian code for practice
EXCEL	MS Spreadsheet program
ELPLA	Program for analyzing raft and piled raft (ELastic PLate)
FEM	Finite element method
FB-PIER	Program for analyzing pile foundations
FLAC 3D	Program for analyzing pile by FDM
FDM	Finite difference method
GARP	Program for analyzing pile foundation
GABAN	Program for analyzing pile foundation
GROUP	Program for analyzing pile groups
MPILE	Program for analyzing piles
PGROUP	Program for analyzing pile groups
PGROUPN	Program for analyzing pile groups
PLAXIS 3D	Program for 3-D finite element model
REPUTE	Program for analyzing pile foundations
SPT	Standard penetration test