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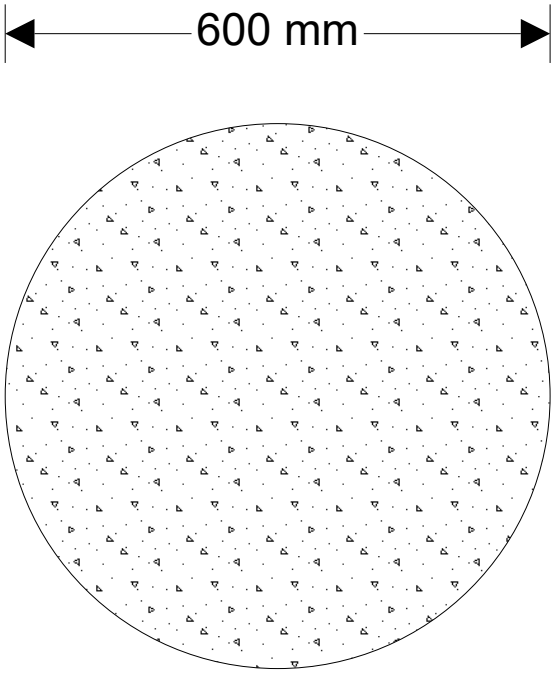
Project: **Pile Analysis & Design example According to EN 1997-1:2004 incorporating Corrigendum Feb. 2009 && the recommended values.**				Job Ref. www.geodomisi.com info@geodomisi.com	
Section: Civil & Geotechnical Engineering				Sheet no./rev. 1	
Calc. Dr. C. Sachpazis	Date 18/03/2017	Chk'd by	Date **Error! No**	App'd by	Date

PILE ANALYSIS

In accordance with EN 1997-1:2004 incorporating Corrigendum dated February 2009 and the recommended values.



Pile details

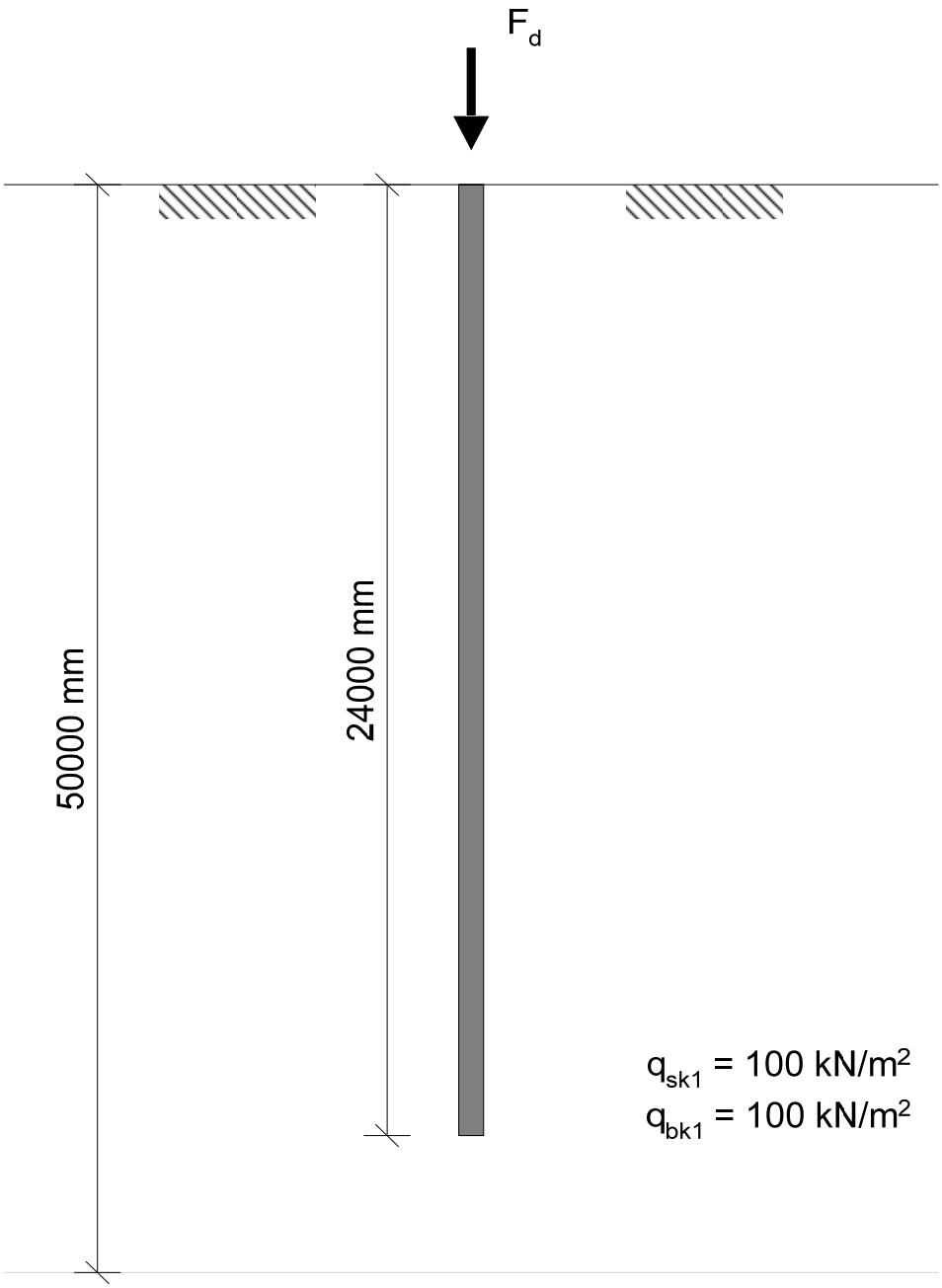
Installation method:	Drilled
Shape:	600 mm diameter
Length:	L = **24000** mm

Material details

Material:	Concrete
Concrete strength class:	C25/30
Part. factor, concrete (EN1992-1-1 cl. 2.4.2.4(1)):	γ_C = **1.50**
Coefficient α_{cc} (EN1992-1-1 cl. 3.1.6(1)):	α_{cc} = **1.00**
Characteristic compression cylinder strength:	f_{ck} = **25** N/mm^2
Design comp. strength (EN1992-1-1 cl. 3.1.6(1)):	$f_{cd} = \alpha_{cc} \times f_{ck} / \gamma_C$ = **16.7** N/mm^2
Mean value of cyl. strength (EN1992-1-1 Table 3.1):	$f_{cm} = f_{ck}$ + 8 MPa = **33.0** N/mm^2
Secant mod. of elasticity (EN1992-1-1 Table 3.1):	E_{cm} = 22000 MPa $\times$ (f_{cm} / 10 MPa)$^{0.3}$ = **31.5** kN/mm^2
Modulus of elasticity:	E = E_{cm} = **31.5** kN/mm^2

Geometric properties

Pile section depth:	h = **600** mm
Bearing area:	$A_{bearing} = \pi \times h^2 / 4$ = **0.283** m^2
Pile perimeter:	$Perim_{pile} = \pi \times h$ = **1.885** m
Moment of inertia:	$I = \pi \times h^4 / 64$ = **636173** cm^4



q_{ski} = Characteristic value, shaft resistance, q_{bki} = Characteristic value, base

Stratum details

Stratum	Geomaterial	Thickness, $t_{stratai}$ (mm)	Characteristic value, base, q_{bki} (kN/m^2)	Characteristic value, shaft, q_{ski} (kN/m^2)
1	Cohesionless	50000	100	100

Action details

Characteristic perm. unfav. action, compression: $G_{c,k,unfav}$ = **100** kN
Characteristic perm. fav. action, compression: $G_{c,k,fav}$ = **0** kN
Characteristic variable unfav. action, compression: $Q_{c,k}$ = **0** kN
Characteristic perm. unfav. action, tension: $G_{t,k,unfav}$ = **125** kN
Characteristic perm. fav. action, tension: $G_{t,k,fav}$ = **0** kN
Characteristic variable unfav. action, tension: $Q_{t,k}$ = **0** kN

Geotechnical partial and model factors:

Design approach 2:
Model factor on axial resistance: γ_{model} = **1.00**
Permanent unfavourable, A1 (Table A.3): $\gamma_{G,unfav,A1}$ = **1.35**
Permanent favourable, A1 (2): $\gamma_{G,fav,A1}$ = **1.00**
Variable unfavourable, A1 (Table A.3): $\gamma_{Q,A1}$ = **1.50**

Characteristic axial resistance

Characteristic axial base resistance: $R_{bk} = A_{bearing} \times q_{bk}$ = **28.3** kN
Characteristic axial shaft resistance per stratum
Stratum 1: $R_{sk1} = q_{sk1} \times Perim_{pile} \times (L - D_{strata1})$ =**4523.9** kN
Characteristic total axial shaft resistance: $R_{sk} = R_{sk1}$ = **4523.9** kN

Axial compressive resistance

Load combination 1: A1 + M1 + R2
Design compression action: $F_{c,d,C1} = \gamma_{G,unfav,A1} \times G_{c,k,unfav} - \gamma_{G,fav,A1} \times G_{c,k,fav} + \gamma_{Q,A1} \times Q_{c,k}$ = **135** kN
Partial resistance factor, bearing (Table A.7): $\gamma_{b,R2}$ = **1.10**
Partial resistance factor, shaft (Table A.7): $\gamma_{s,R2}$ = **1.10**
Design compressive resistance: $R_{c,d,C1} = (R_{bk} / \gamma_{b,R2} + R_{sk} / \gamma_{s,R2}) / \gamma_{model}$ = **4138.3** kN
$F_{c,d,C1} / R_{c,d,C1}$ = **0.033**

***PASS** - Design compressive resistance exceeds design load*

Axial tensile resistance

Load combination 1: A1 + M1 + R2

Design tension load: $F_{t,d,C1} = \gamma_{G,unfav,A1} \times G_{t,k,unfav} - \gamma_{G,fav,A1} \times G_{t,k,fav} + \gamma_{Q,A1}$

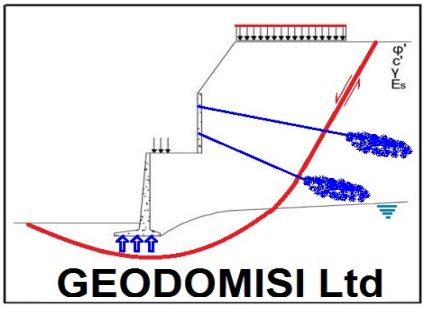
$\times Q_{t,k}$ = **168.8** kN

Partial resist. factor, shaft in tension (Table A.7): $\gamma_{s,t,R2}$ = **1.15**

Design tensile resistance: $R_{t,d,C1} = R_{sk} / (\gamma_{s,t,R2} \times \gamma_{model})$ = **3933.8** kN

$F_{t,d,C1} / R_{t,d,C1}$ = **0.043**

***PASS** - Design tensile resistance exceeds design load*



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