

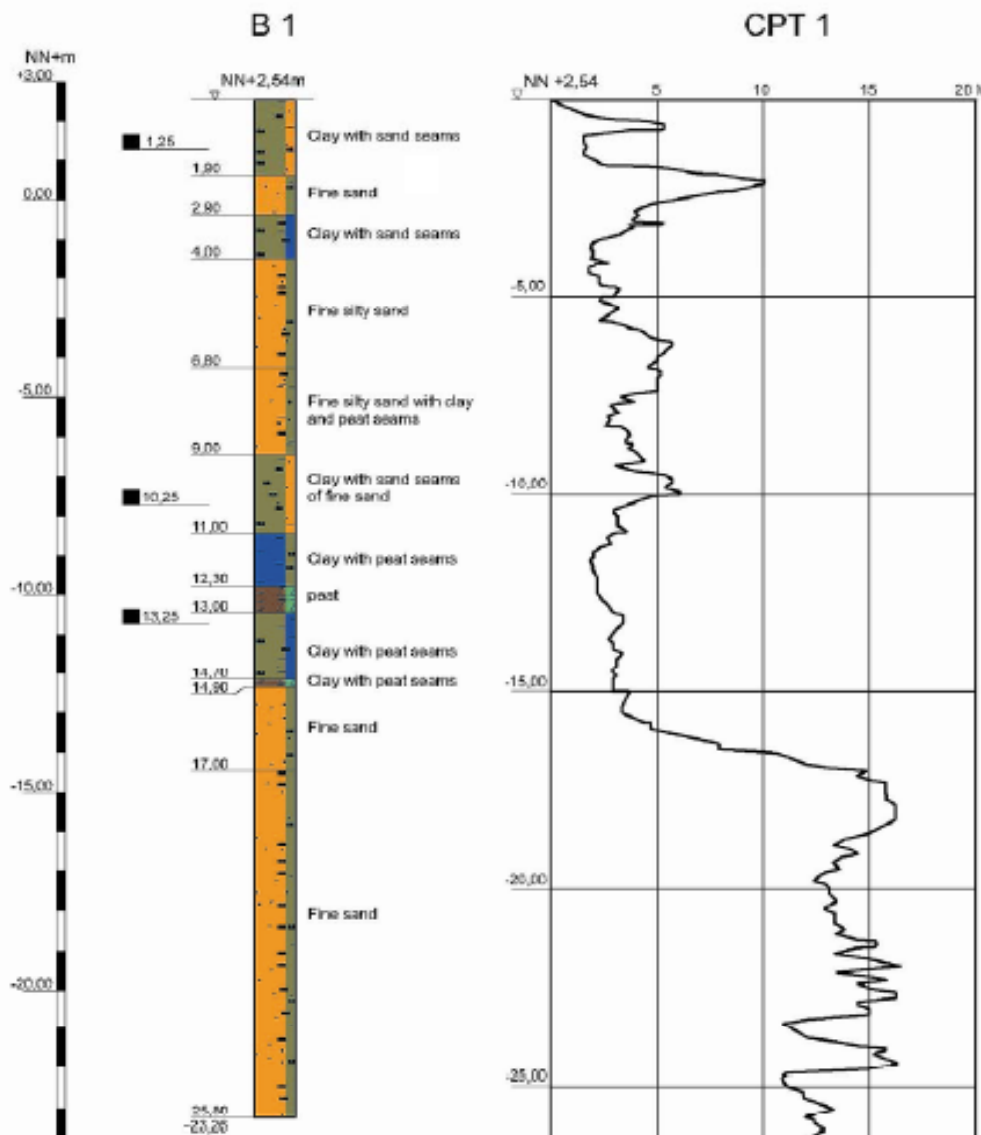


# Worked example – characteristic values

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## *Example: pile foundation in sand*

Boring and CPT-profile  
for the selection of  
characteristic values of  
ground parameter

### 7.6.2.3 Ultimate compressive resistance from ground test results

(8) The characteristic values may be obtained by calculating:

$$R_{b;k} = A_b q_{b;k} \quad \text{and} \quad R_{s;k} = \sum_i A_{s;i} \cdot q_{s;i;k} \quad (7.9)$$

where  $q_{b;k}$  and  $q_{s;i;k}$  are characteristic values of base resistance and shaft friction in the various strata, obtained from values of ground parameters.

NOTE If this alternative procedure is applied, the values of the partial factors  $\gamma_b$  and  $\gamma_s$  recommended in Annex A may need to be corrected by a model factor larger than 1,0. The value of the model factor may be set by the National annex.

**German NA** has applied a model factor and gives  $\gamma_b = 1.40$  and  $\gamma_s = 1.40$

## Annex D (Informative) Cone and piezocone penetration tests

**Table D.3 — Unit base resistance  $q_b$  of cast in-situ piles in coarse soil with little or no fines**

Normalised settlement $s/D_s$ ; $s/D_b$	Unit base resistance $q_b$ in MPa, at average cone penetration resistance $q_c$ (CPT) in MPa			
	$q_c = 10$	$q_c = 15$	$q_c = 20$	$q_c = 25$
0,02	0,70	1,05	1,40	1,75
0,03	0,90	1,35	1,80	2,25
0,10 (= $s_g$ )	2,00	3,00	3,50	4,00

NOTE Intermediate values may be interpolated linearly.

In the case of cast in-situ piles with pile base enlargement, the values shall be multiplied by 0,75.

$s$  is the normalised pile head settlement

$D_s$  is the diameter of the pile shaft

$D_b$  is the diameter of the pile base

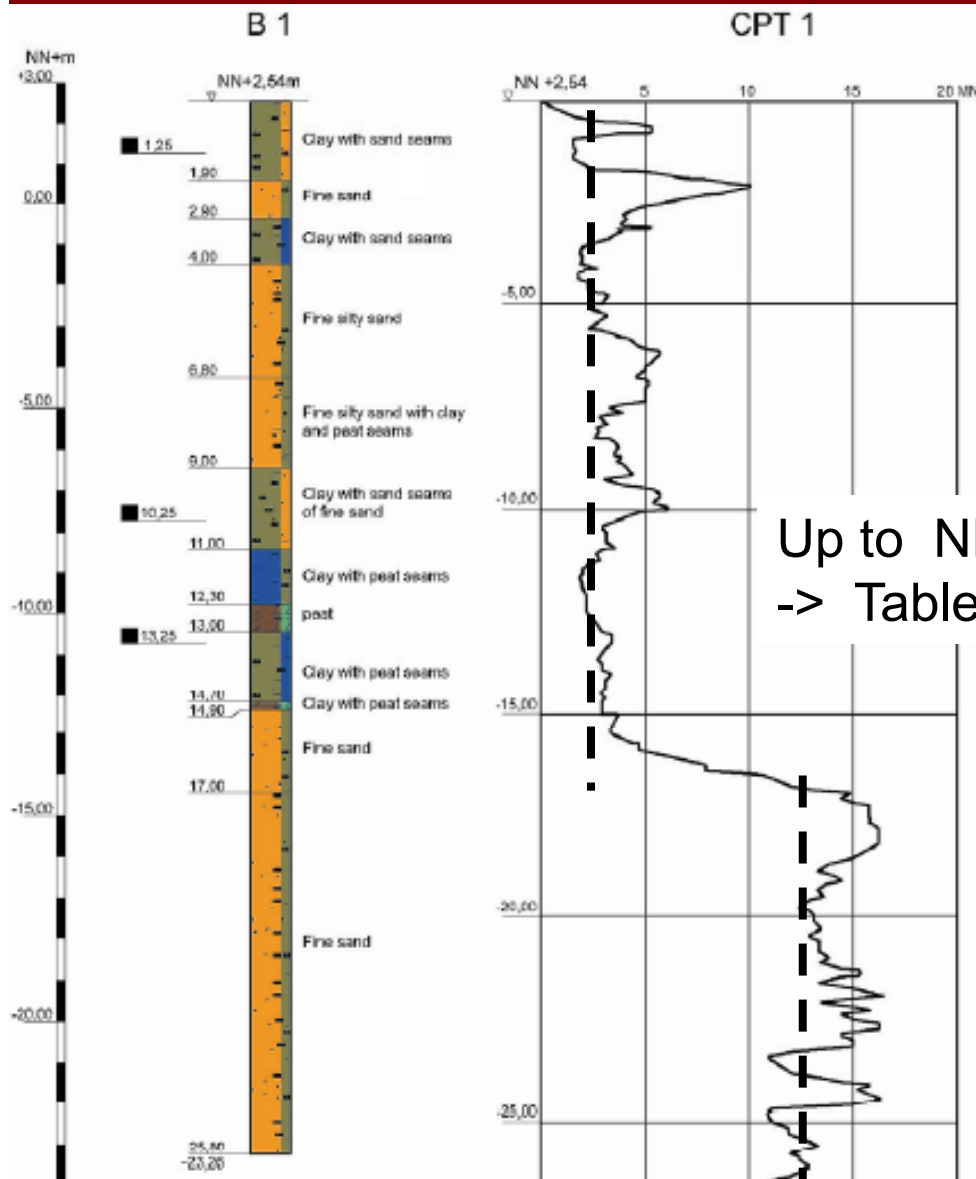
$s_g$  is the ultimate settlement of pile head

## *Annex D (Informative)*

### *Cone and piezocone penetration tests*

**Table D.4 — Unit shaft resistance  $q_s$  of cast in-situ piles in coarse soil with little or no fines**

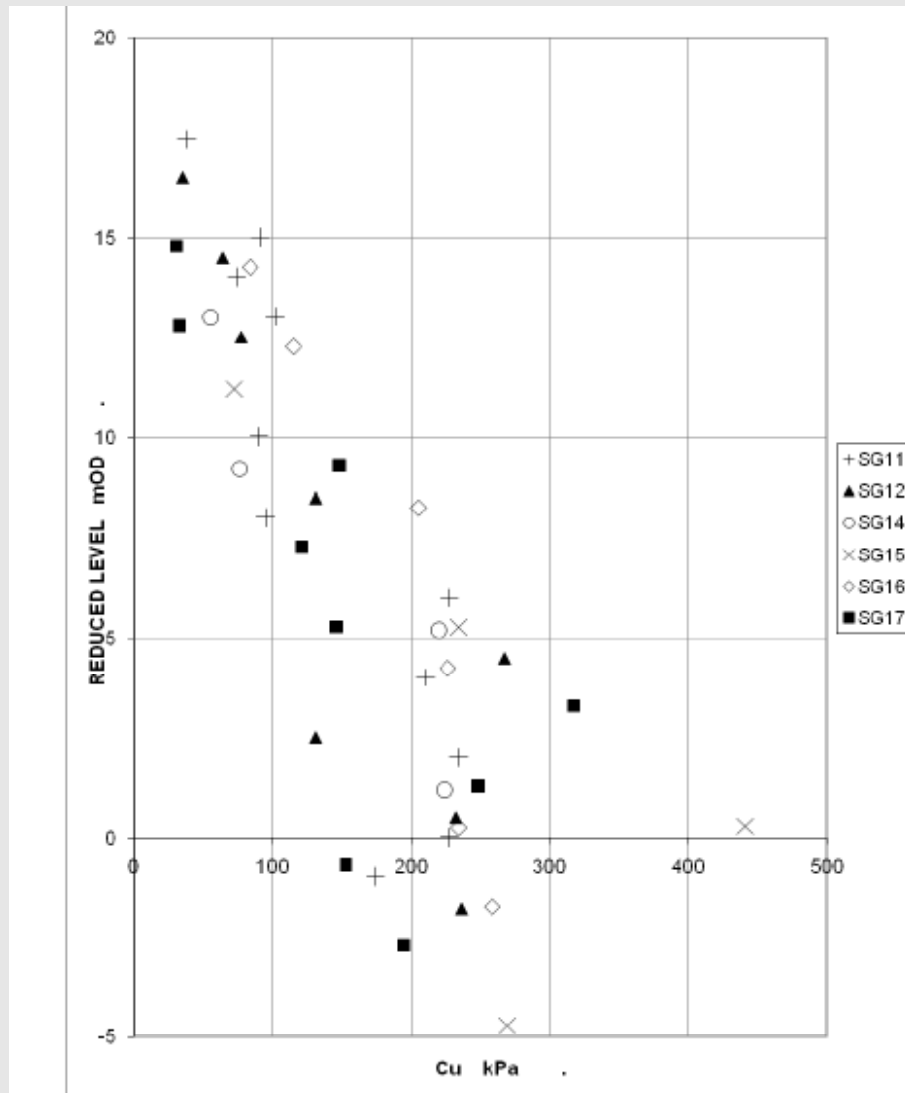
Average cone penetration resistance $q_c$ (CPT) MPa	Unit shaft resistance $q_s$ MPa
0	0
5	0,040
10	0,080
$\geq 15$	0,120
<b>NOTE</b> Intermediate values may be interpolated linearly	



Boring and CPT-profile for the selection of characteristic values of ground parameter

Up to NN – 16.5m:  $q_c = 2.5 \text{ MN/m}^2$   
-> Table D.4:  $q_{s,k} = 0.02 \text{ MPa}$

From NN –16.5m:  $q_c = 12.5 \text{ MN/m}^2$   
-> Table D.3:  $q_{b,k} (s_g) = 2.5 \text{ MPa}$



## *Example: pile foundation in clay*

Undrained shear strength  $c_u$   
as results of UU triaxial  
tests with specimen from  
samples of 6 borings

## *DIN 1054:2002 - Annex B (informativ)*

### *Characteristic values of pile resistance of axially loaded piles*

**Table B.4 — Unit shaft resistance  $q_{s,k}$  of cast in situ piles in clay**

Undrained shear strength $c_{u,k}$ MN/m <sup>2</sup>	Unit shaft resistance $q_{s,k}$ MN/m <sup>2</sup>
0,025	0,025
0,10	0,040
$\geq 0,20$	0,060

Intermediate values may be interpolated linearly

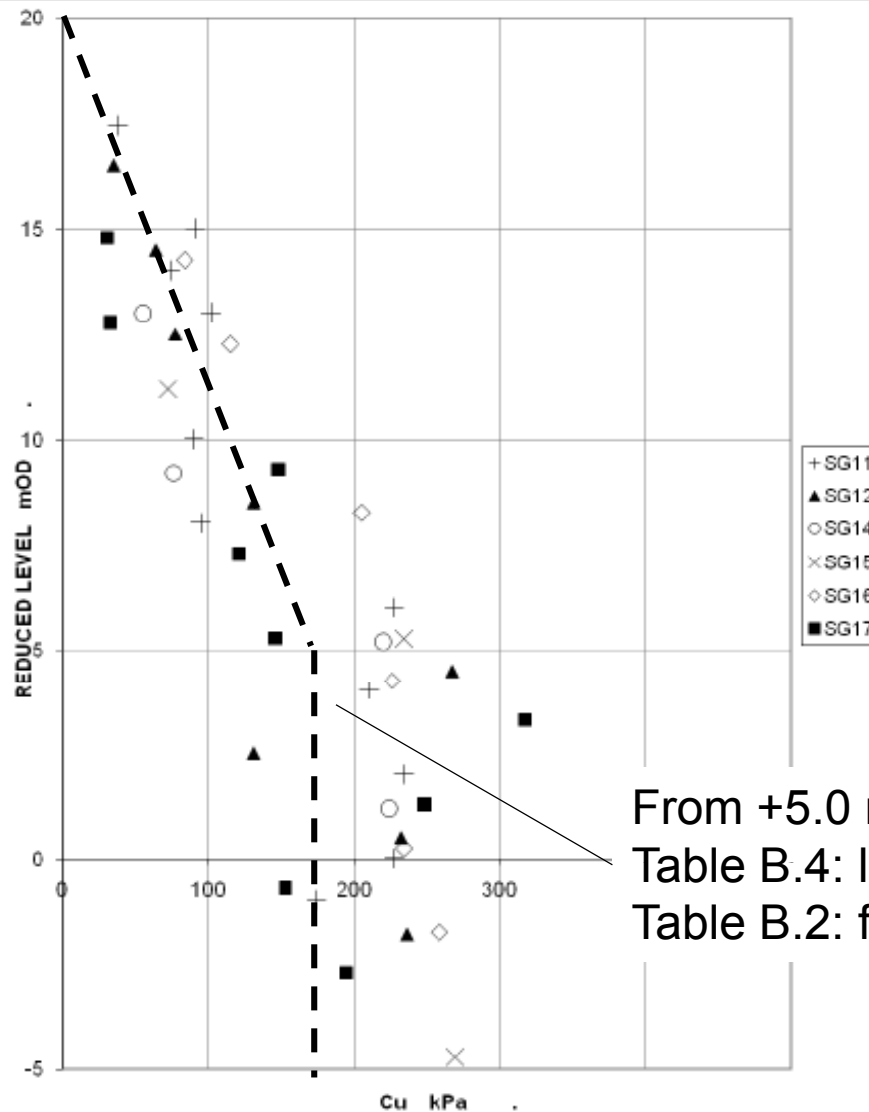


## *DIN 1054:2002 - Annex B (informativ)*

### *Characteristic values of pile resistance of axially loaded piles*

**Table B.2 — Unit base resistance  $q_{b,k}$  of cast in-situ piles in clay**

Normalized pile settlement $s / D_s$ bzw. $s / D_b$	Unit base resistance $q_{b,k}$ MN/m <sup>2</sup>	
	Undrained shear strength $c_{u,k}$ MN/m <sup>2</sup>	
	0,10	0,20
0,02	0,35	0,90
0,03	0,45	1,10
0,10 ( $s_g$ )	0,80	1,50
Intermediate values may be interpolated linearly		



## Example: Pile foundation in clay

Undrained shear strength  $c_u$   
as results of UU triaxial  
tests with specimen from  
samples of 6 borings

From +5.0 mOD:  $q_{c,k} = 180 \text{ kPa}$

Table B.4: linear increase to  $q_{s,k} = 0.056 \text{ MN/m}^2$

Table B.2: for  $s=20\text{mm} \approx 0.03 \times D_{\text{pile}}$ :  $q_{b,k} = 0.97 \text{ MN/m}^2$

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