Example 2.6 Pile foundation in sand
Note: this is a persistent design situation; for simplicity, accidental design situations do NOT need to be checked.

Question		Instruction	Answer			
GENERAL						
1	Please provide your contact details in case we need to clarify your submission*	*Will be kept strictly confidential	Name: **Adam Krasiński** Affiliation: **Gdansk University of Technology** Email address: **akra@pg.gda.pl**			
2	How many structures of this kind have you previously designed?	Tick one	☐ None ☐ 1-2 ☐ 3-6 ☒ More than 6			
3	Having completed your design to Eurocode 7, how confident are you that the design is sound?	Tick one	☐ Very unsure ☐ Unsure ☒ Confident ☐ Very confident			
ULTIMATE LIMIT STATE						
4	What correlations did you use to derive soil parameter values (if used) for the ULS verification? If more than one, please list others below	Free text	Description: **Polish code: PN-B-04452** Author: Title: Pages:			
4a	Any other correlations? (please give same info as above)					
5	What assumptions did you make in choosing these correlations?	Free text	**Because there are a correlations between cone resistance q_c and soil parameters I_D and I_L**			
6	How did you account for any variation in parameters with depth?	Tick one	☐ Ignored variation with depth ☐ Assumed linear variation ☐ Assumed bi-linear variation ☒ Assumed stepped variation ☐ Other (specify) …			
7	Please explain the reasons for your answer to Q6	Free text	Because the subsoil is layered and the distribution of qc showed on fig. 2.6b can by divided to several parts of constant average values of qc.			
8	What is the characteristic value of q_c at these depths?	Provide values in units of MPa	At 2.5 m, q_c = **5**	At 7.5 m, q_c = **4**	At 12.5 m, q_c = **2.5**	
			At 17.5 m, q_c = **13**	At 22.5 m, q_c = **13**		
9	How did you assess these values?	Tick all that apply	☒ By eye ☐ By linear regression ☐ By statistical analysis ☐ From an existing standard (specify) … ☐ From a published correlation (specify) … ☐ Comparison with a previous design ☐ From the soil description, not using the data ☐ Other (specify) …			
10	(If determined) What is the characteristic value of unit shaft resistance q_s at these depths?	Provide values in units of kPa	At 2.5 m, q_s = **12**	At 7.5 m, q_s = **22**	At 12.5 m, q_s = 0	
			At 17.5 m, q_s = **75**	At 22.5 m, q_s = **75**		
11	(If determined) What is the characteristic value of unit base resistance q_b at these depths?	Provide values in units of kPa	At 2.5 m, q_b = 0	At 7.5 m, q_b = 0	At 12.5 m, q_b = 0	
			At 17.5 m, q_b = **3125**	At 22.5 m, q_b = **3125**		
12	Which calculation model did you use to determine the pile's compressive resistance?	Tick one	☐ Annex D.6 from EN 1997-2 ☐ Annex D.7 from EN 1997-2 ☐ Alternative given in a national annex (specify) … ☒ Alternative given in a national standard (specify) …**PN-B-02482** ☐ Finite element analysis ☐ Finite difference analysis ☐ Other (specify) …			
13	Which country's National Annex did you use to interpret EN 1997-1?	Free text	Polish			
14	Which Design Approach did you use for verification of the Ultimate Limit State (ULS)?	Tick one	☒ Design Approach 1 Combinations 1 and 2 ☐ Design Approach 1 Combination 1 only ☐ Design Approach 1 Combination 2 only ☐ Design Approach 2 ☐ Design Approach 2* ☐ Design Approach 3 ☐ Other (specify) …			
15 15a	What values of partial factors did you use for this ULS verification?	Provide values	1st combination		2nd combination (if used)	
			γ_G = **1.35**	γ_Q = **1.5**	γ_G = **1.0**	γ_Q = **1.3**
			γ_ϕ	γ_c	γ_ϕ	γ_c

			γ_{cu}	γ_s = **1.0**	γ_{cu}	γ_s = **1.3**
			γ_b = **1.25**	γ_t	γ_b = **1.6**	γ_t
16	What correlation factors (if any) did you use for this verification?	Provide values	ξ_3 = **1.4**		ξ_4 = **-**	
17	What model factor (if any) did you use for this verification?	Provide values	γ_{Rd} = **1.0**			
18	What length does the pile need to avoid an ultimate limit state?	Provide value in m	L_{ULS} = **21.0**			
19	What is the design compressive force that the pile must be designed for according to Eurocode 2?	Provide values in kN	Design compressive force F_{cd} = **630**			
SERVICEABILITY LIMIT STATE						
20	(If determined) What is the settlement of the pile in the serviceability limit state?	Provide value in mm	s_{SLS} =			
CONCLUDING QUESTIONS						
21	What other assumptions did you need to make to complete your design?	Free text				
22	Please specify any other data that you would have liked to have had to design this type of foundation	Free text	Number of piles in the foundation			
23	How conservative do you consider your previous national practice to be for this design example?	Tick one	☐ Very conservative ☐ Conservative ☐ About right ☑ Unconservative ☐ Very unconservative			
24	How conservative do you consider Eurocode 7 (with your National Annex) to be for this example?	Tick one	☐ Very conservative ☑ Conservative ☐ About right ☐ Unconservative ☐ Very unconservative			
25	How does your Eurocode 7 design compare with your previous national practice?	Tick one	☐ Much more conservative ☑ More conservative ☐ About the same ☐ Less conservative ☐ Much less conservative			
26	Please provide any other relevant information needed to understand your solution to this design exercise	Free text				

PLEASE SUBMIT YOUR ANSWERS AT www.eurocode7.com/etc10/Example 2.6
THANK YOU FOR YOUR CONTRIBUTION!