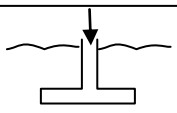


EUROCODE 7 DESIGN APPROACH 1

Basic procedure (incorporates some simplifications)

START

Assess design scenario



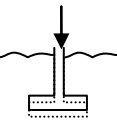
List all possible limit states:

ULS



&

SLS

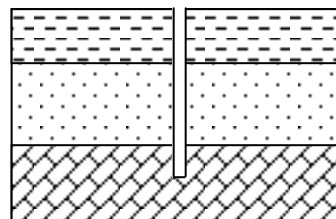
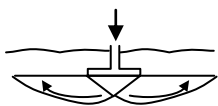


For each limit state

Assess worst credible scenario (e.g. water pressures)



Choose appropriate calculation model



Ground properties

- SI
- Lab testing
- Experience

Statistics
Judgement
Construction process

Select **characteristic** actions (e.g. loads):

F_k

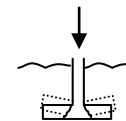
and **characteristic** material properties (e.g. soil strength, stiffness):

X_k

relevant to calculation model

Assess design scenario

Combination 1: Typically governs failure in the structure



Combination 2: Typically governs failure in the ground



Parameter	Factor	Combination 1	Combination 2
<i>Partial load factors (γ_F)</i>			
Permanent unfavourable action	γ_G	1.35	1.00
Variable unfavourable action	γ_Q	1.50	1.30
Permanent favourable action	γ_G	1.00	1.00
<i>Partial material factors (γ_m)</i>			
$\tan \phi'$	$\gamma_{\tan \phi'}$	1.00	1.25
Effective cohesion c'	$\gamma_{c'}$	1.00	1.25
Undrained shear strength c_u	γ_{c_u}	1.00	1.40
Unit weight of ground γ	γ_g	1.00	1.00

Calculate **design** actions:

$$F_d = \gamma_F F_k$$

and **design** material properties:

$$X_d = X_k / \gamma_m$$

Calculate design action effect (e.g. load):
 E_d
and design resistance
 R_d

Ensure
 $E_d \leq R_d$

Calculate design action effect (e.g. settlement)
 E_d
and SLS limiting deformation
 C_d

Ensure
 $E_d \leq C_d$

Check ULS

Apply appropriate partial factors
 γ_m, γ_F

Check SLS

Partial factors typically =1 for SLS