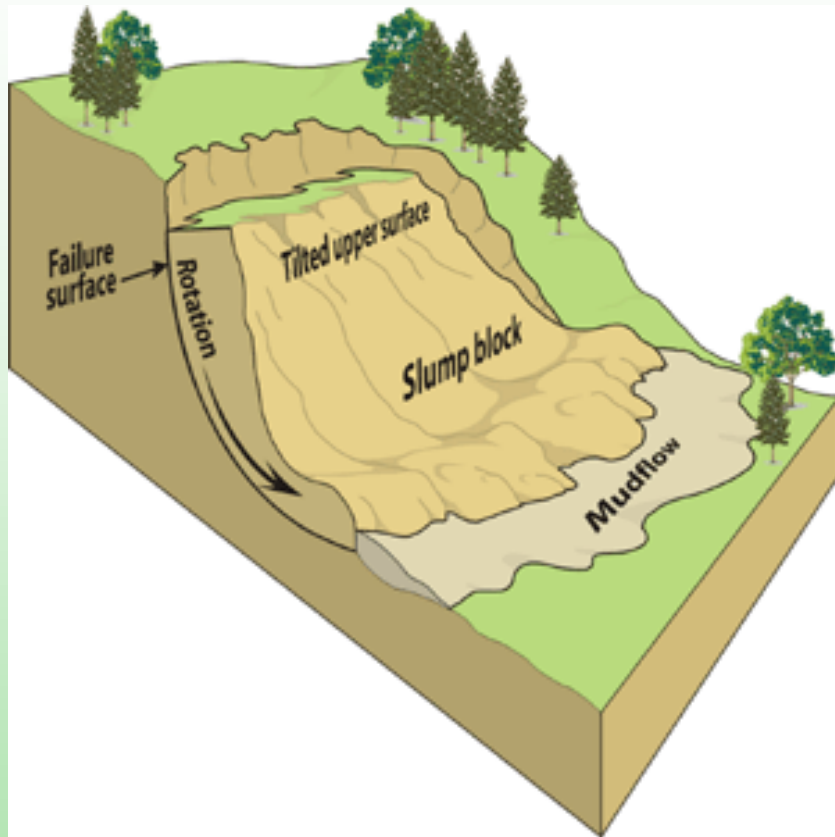

GEOTEHNIČKO INŽENJERSTVO

(IV . Vježbe)

2. PROGRAM – stabilnost kosine

STABILNOST KOSINE



shematski prikaz nestabilne kosine
KLIZIŠTE

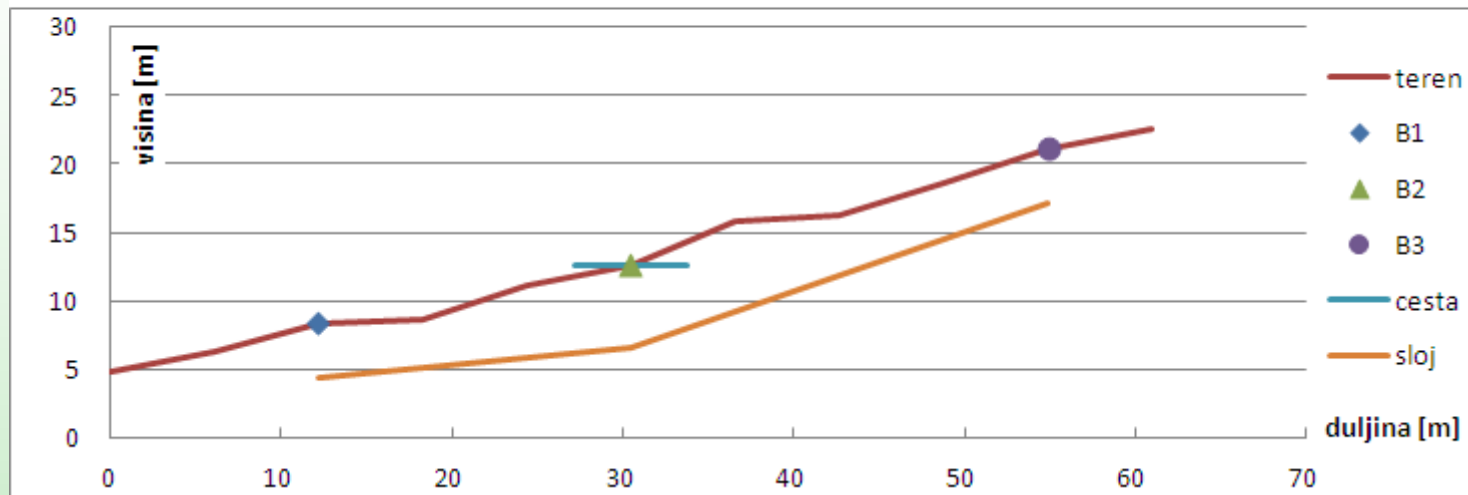


fotografija gornjeg dijela klizišta u
zoni prometnice

STABILNOST KOSINE - zadatak

STUDENT: _____

poprečni presjek kosine:



ZADATAK:

- kontrola stabilnosti kosine prije zahvata (procijeniti kritičnu razinu pojave podzemne vode)
 - kontrola stabilnosti kosine iznad prometnice za drenirano stanje u uvjetima 'spriječenih' deformacija
 - kontrola stabilnosti kosine ispod prometnice za drenirano stanje u uvjetima 'spriječenih' deformacija
 - kontrola stabilnosti kosine ispod prometnice za drenirano stanje u uvjetima većih deformacija
 - analiza faktora stabilnosti početne - kritične klizne plohe, za sve promjene geotehničkog modela
- * osigurati stabilnost kosine za trajno stanje uz primjenu elemenata stabilizacije kosine: gravitacijski potporni zid ($c = 100 \text{ kN/m}^2$, $f_i = 45$ stup., $\gamma = 24 \text{ kN/m}^3$); nasip od zbijenog krupnozrnatog materijala ($c = 0$, $f_i = 35$ stup., $\gamma = 22 \text{ kN/m}^3$); kopani drenovi u zoni ispod prometnice do dubine maksimalno 3 m te bušeni drenovi u zoni iza potpornog zida pod nagibom 10 stup. maksimalne duljine 10 m); planiranje

GEOTEHNIČKI ISTRAŽNI RADOVI



BUŠENJE I
UZORKOVANJE
TLA

- geotehnički profil



ATTERBERGOVE
GRANICE
PLASTIČNOSTI

Granica tečenja

Granica plastičnosti

- indeks plastičnosti I_p

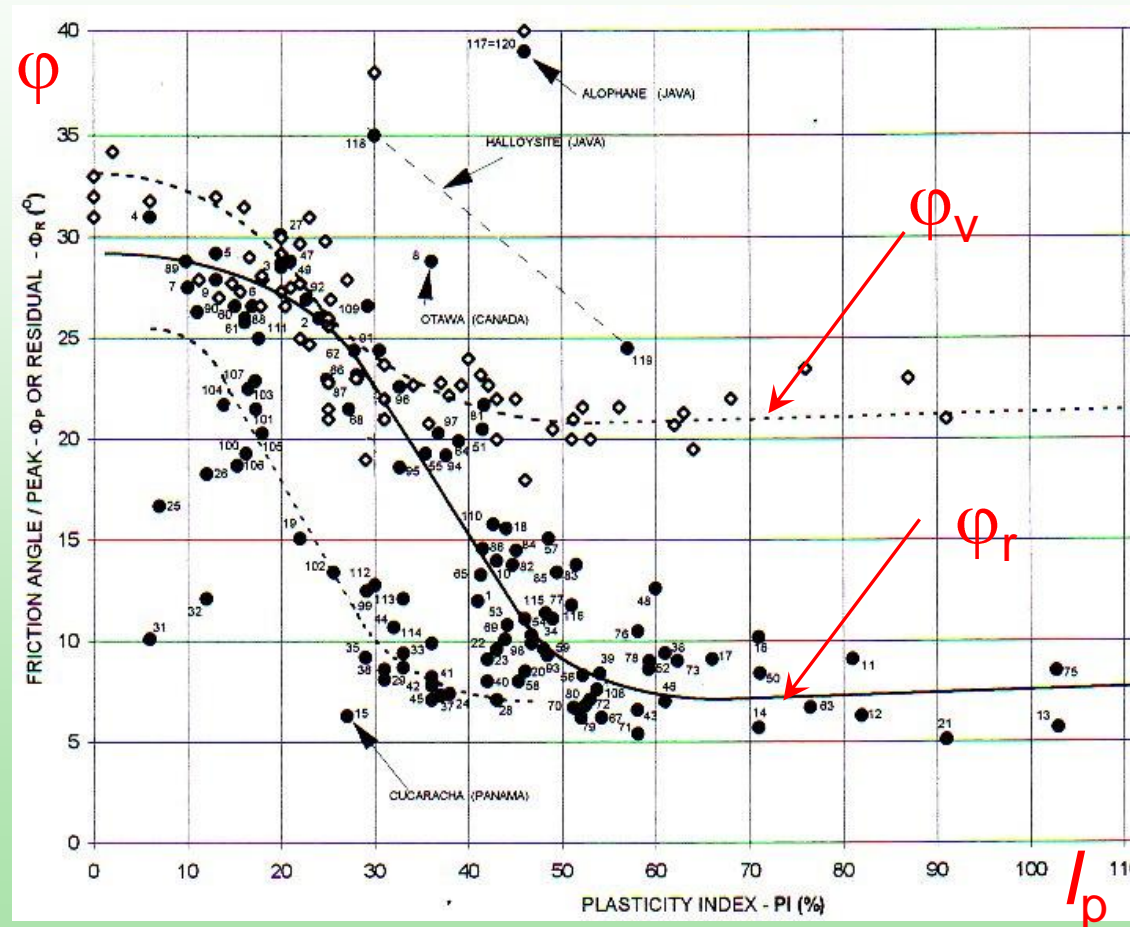
2. PROGRAM – geometrija, djelovanja, profil tla

tlo:						teren:			
tip tla - 1		CL				no.	x [m]	y [m]	
tip tla - 2		CH				1	0	4.9	
Geotehnički profil tla (terenska klasifikacija + indeks plastičnosti Ip)						2	6.1	6.3	
dubina [m]	B1		B2		B3		3	12.2	8.4
	tip tla	Ip	tip tla	Ip	tip tla	Ip	4	18.3	8.7
0.5	1	33	1	32	1	27	5	24.4	11.2
1	1	28	1	27	1	28	6	30.5	12.6
1.5	1	29	1	31	1	27	7	36.6	15.8
2	1	31	1	33	1	33	8	42.7	16.3
2.5	1	25	1	27	1	33	9	48.8	18.6
3	1	30	1	29	1	28	10	54.9	21.1
3.5	1	29	1	26	1	27	11	61	22.6
4	2	45	1	33	2	44	cesta:		
4.5	2	48	1	30	2	44	os	x [m]	y [m]
5	2	48	1	25	2	48	širina =	6.5	m
5.5	2	45	1	30	2	46	q =	16.7	kN/m ²
6	2	45	2	44	2	46	bušotine:		
6.5	2	50	2	44	2	49	B1	x [m]	y [m]
7	2	50	2	49	2	46	B2	12.2	8.4
7.5	2	48	2	45	2	48	B3	30.5	12.6
								54.9	21.1

KARAKTERISTIČNA VRIJEDNOST P. MAT.

$I_p \rightarrow I_{p_sr}$ (srednja vrijednost) \rightarrow vršni kut trenja $\phi_{v_sr}(I_{p_sr}) \rightarrow \phi_{v_k}$

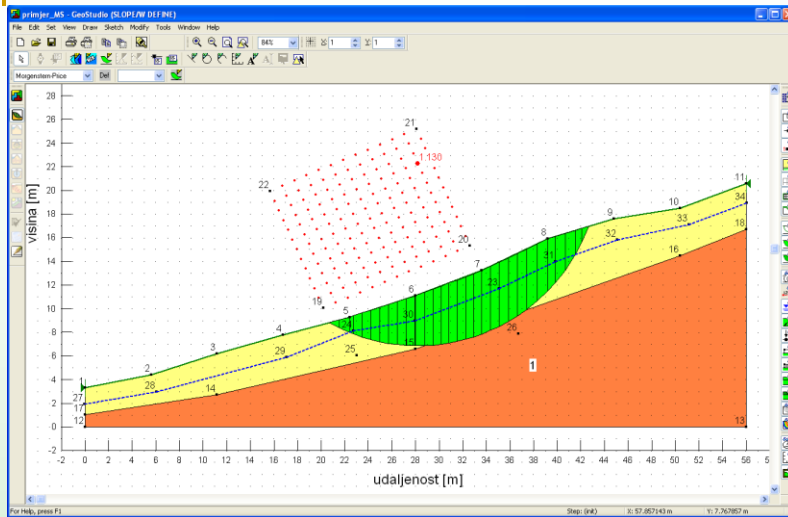
\rightarrow rezidualni kut trenja $\phi_{r_sr}(I_{p_sr}) \rightarrow \phi_{r_k}$



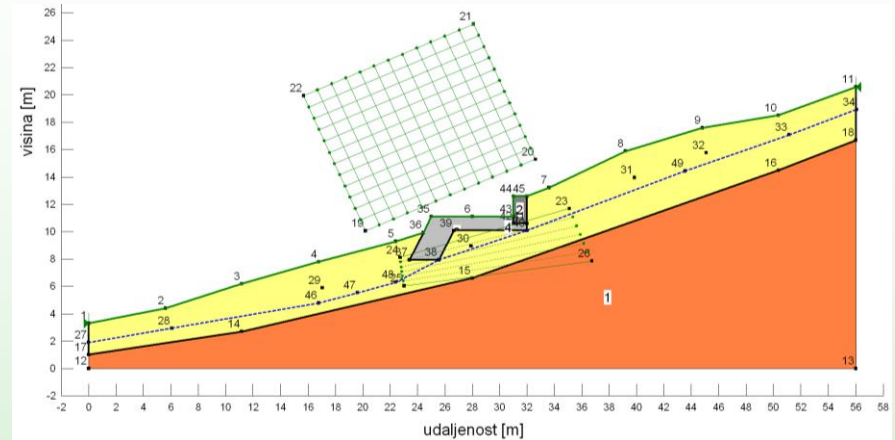
GEOTEHNIČKI MODEL – SLOPE/W



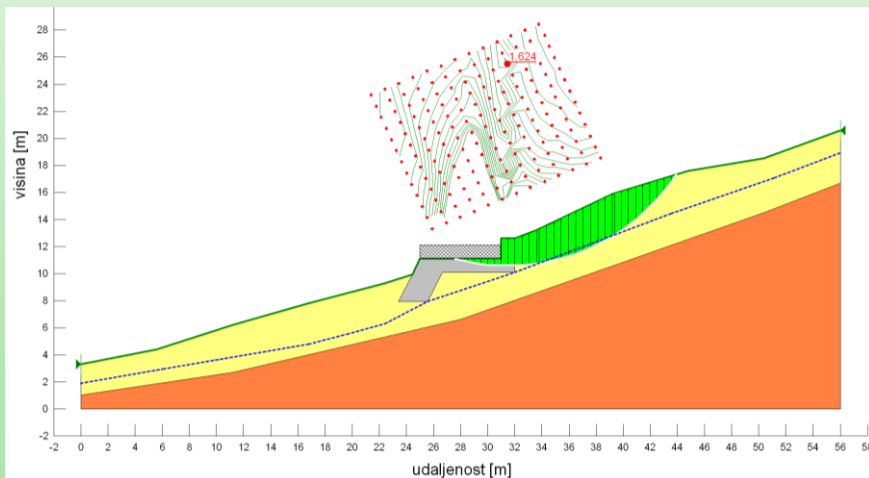
SLOPE/W



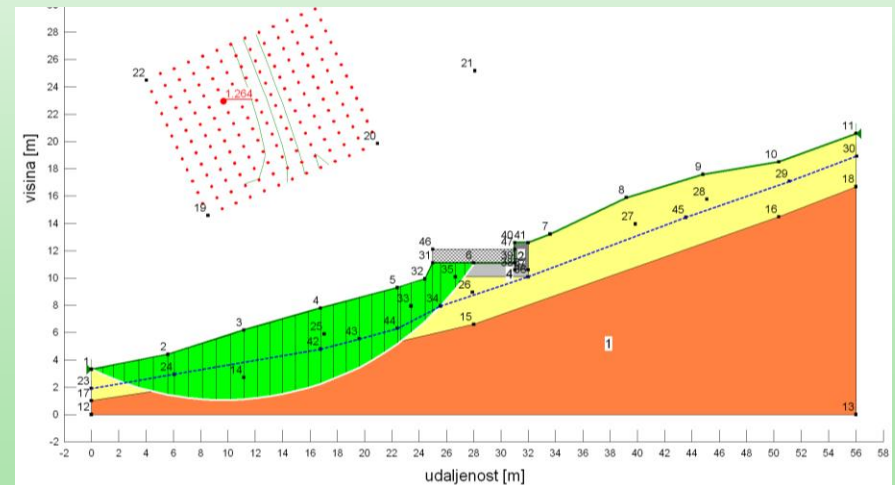
stabilnost kosine za početno stanje



model kosine nakon izgradnje prometnice

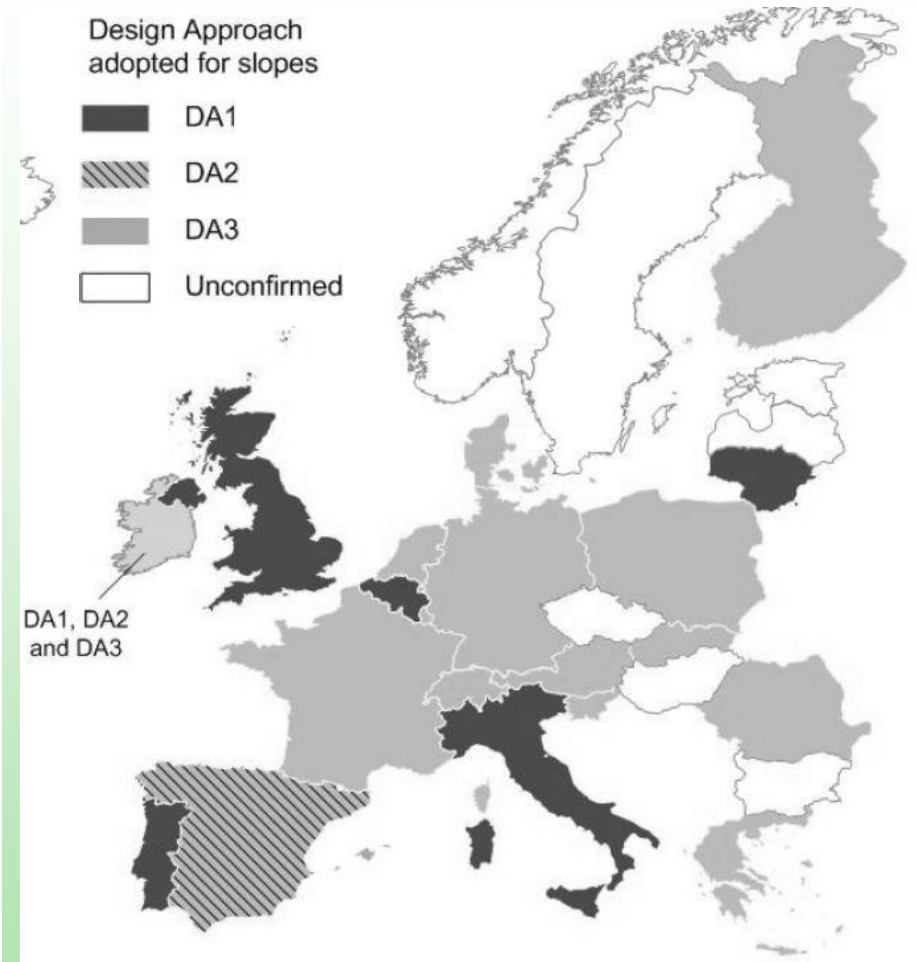
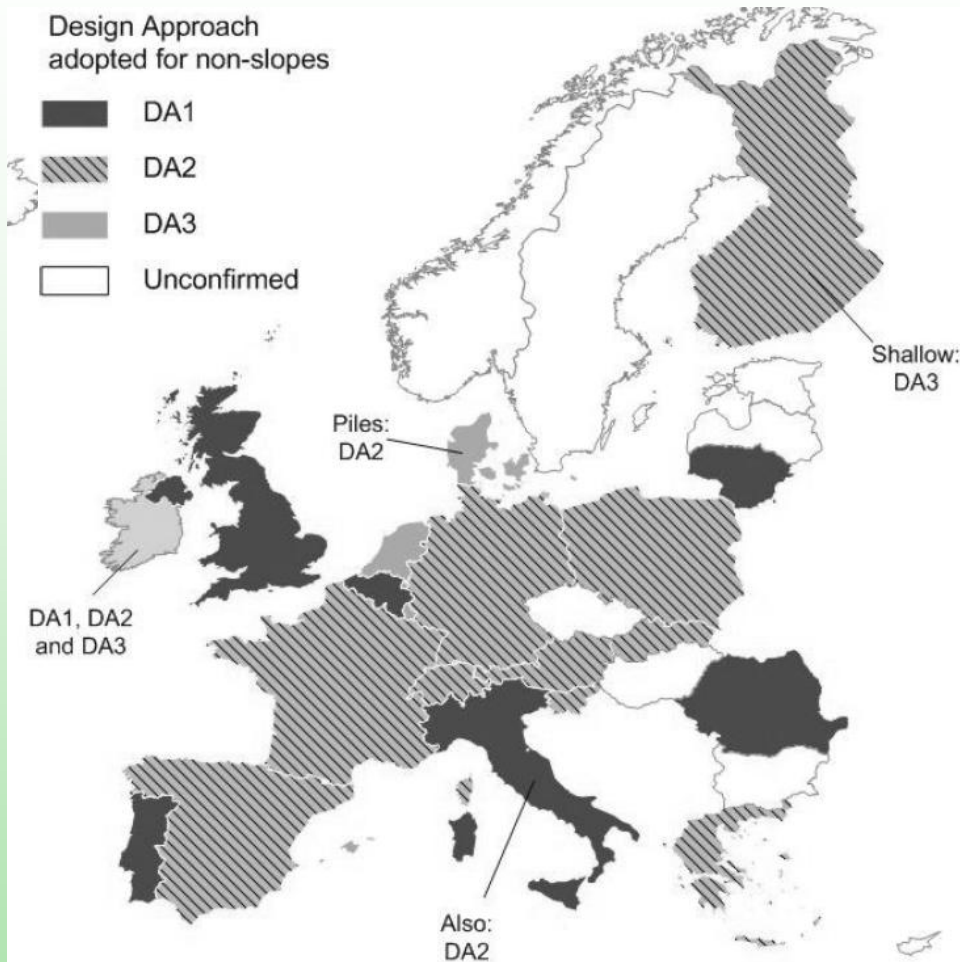


stabilnost kosine iznad prometnice



stabilnost kosine ispod prometnice

PRORAČUNSKI PRISTUPI – nacionalni dodaci u EU



primjena proračunskih pristupa za proračun geotehničkih konstrukcija te za proračun kosina prema nacionalnim dodacima EU

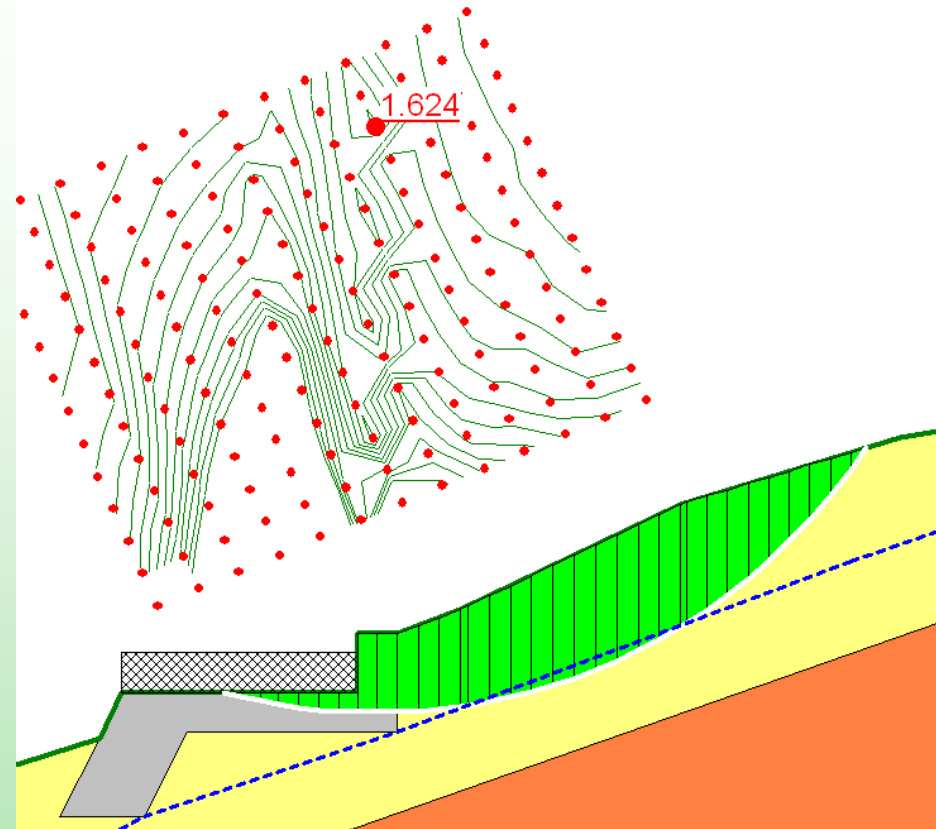
STABILNOST KOSINE – EC7 + klasičan pristup

Partial factors for GEO/STR in persistent and transient design situations
Slopes, footings, and walls (see Chapter 6)

Design Approach 1		Combination 1		↓	↓	↓			
Design Approach 2		Combination 2		↓	↓	↓			
Design Approach 3		↓	↓	↓	↓	↓			
Partial factor set		A1	A2	M1	M2	R1	R2	R3	
Permanent actions (G)	Unfav'ble	γ_G	1.35	1.0					
	Favourable	$\gamma_{G,fav}$	1.0	1.0					
Variable actions (Q)	Unfav'ble	γ_Q	1.5	1.3					
	Favourable	$\gamma_{Q,fav}$	0	0					
Coefficient of shearing resistance ($\tan \varphi$)	γ_φ			1.0	1.25				
Effective cohesion (c')	$\gamma_{c'}$			1.0	1.25				
Undrained strength (c_u)	γ_{c_u}			1.0	1.4				
Unconfined compressive strength (q_u)	γ_{q_u}			1.0	1.4				
Weight density (γ)	γ_γ			1.0	1.0				
Bearing resistance (R_v)	γ_{R_v}					1.0	1.4	1.0	
Sliding resistance (R_h)	γ_{R_h}					1.0	1.1	1.0	
Earth resistance ... retaining structures ... slopes	γ_{R_e}					1.0	1.4 1.1	1.0	
Prestressed anchorages	γ_a					1.1	1.1	1.0	

PP3

$$E_d \leq R_d$$



Faktor sigurnosti $\rightarrow F_s = R_k(M2) / E_d(A2)$

$F_s \leq 1.0$ kosina je nestabilna

$F_s > 1.5$ kosina je stabilna za trajno stanje

$F_s > 1.2$ kosina je stabilna za privremeno stanje

