S.1. NASLOVNA STRAN

Načrt in številčna oznaka načrta:

8 NAČRT IZKOPA IN OSNOVNE PODGRADNJE ZA PODZEMNE OBJEKTE

Naročnik: **Stanovanjski sklad Republike Slovenije, javni sklad**
Poljanska cesta 31
1000 Ljubljana

Ime oz. firma in sedež naročnika:

Objekt: **»STANOVANJSKA SOSESKA NOVO BRDO V OBMOČJU UREJANJA OPPN 252, FUNKCIONALNA ENOTA E2«**
Zaščita gradbene jame

Vrsta projektne dokumentacije: **Projekt PZR**
Za gradnjo: **NOVA GRADNJA**

Odgovorni vodja projekta: **Aljoša Dekleva, univ. dipl. inž. arh.**
IZS A-1117

Izdelovalec: **GEOEKSPERT**
PODJETJE ZA UPORABNO GEOTEHNIKO
Igor Resanovič univ.dipl.inž.rud. in geotehnol. s.p.
Ob Koprivnici 57, 3000 Celje

GEOEKSPERT
Igor Resanovič dipl. ing. geotehnol. s.p.
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Ime oz. firma in sedež izvajalca:

Odgovorna oseba projektanta: **Igor Resanovič univ.dipl.inž.rud. in geotehnol.**
IZS RG-0031

Odgovorni projektant: **Igor Resanovič univ.dipl.inž.rud. in geotehnol.**
IZS RG-0031

IGOR RESANOVIĆ
univ. dipl. inž. rud. in geotehnol.
IZS RG-0031

Številka projekta: **118/16 – E2**
Številka načrta: **8/118/16 – E2**
Datum izdelave načrta: **Celje, April 2018**

Številka, kraj in datum izdelave načrta:

S.2. KAZALO VSEBINE NAČRTA

Objekt: **»STANOVANJSKA SOSESKA NOVO BRDO V OBMOČJU UREJANJA OPPN 252, FUNKCIONALNA ENOTA E2– Zaščita gradbene jame«**

Vrsta projektne dokumentacije: **Načrt izkopa in osnovne podgradnje za podzemne objekte**

Št.:		**Dokument:**	**Id. oznaka:**
Št. mape:		**118/16 – E2**	
		Naslovna stran	**S.1**
		Kazalo vsebine načrta	**S.2.**
		Tehnično poročilo	**T.**
		Risbe	**G**
		Situacija	G.1
		Prečni prerez - sever	G.2
		Prečni prerez - zahod	G.3
		Prečni prerez - vzhod	G.4
		Geostatični izračuni	**P.**
		Geostatični izračuni	P.1.-P.6.

Objekt: **»STANOVANJSKA SOSESKA NOVO BRDO V OBMOČJU UREJANJA OPPN 252, FUNKCIONALNA ENOTA E2 – Zaščita gradbene jame«**

Vrsta projektne dokumentacije: **Načrt izkopa in osnovne podgradnje za podzemne objekte**

T. TEHNIČNO POROČILO

1 UVOD

S strani naročnika smo dobili naročilo za izdelavo PZR projekta za zaščito gradbene jame na objektu v stanovanjski soseski Novo Brdo v območju urejanja OPPN 252, funkcionalne enote E2. Samo območje varovanja gradbene jame je z ene strani omejeno s cesto Pot Rdečega križa, z druge strani se dviguje brežina od 7,00 do 9,00 m visoka obstoječa brežina, drugače gre za gradbišče.

Položaj infrastrukture (komunalni vodi, kanalizacija itd.), je potrebno še enkrat preveriti na lokaciji terena glede na vrisane geotehnične ukrepe s strani pooblaščene organizacije. Eventualna premestitev komunalnih vodov ni predmet tega projekta.

Geodetske osnove za izdelavo projekta zaščite gradbene jame je posredoval naročnik.

Ta projekt obravnava izvedbo zaščite gradbene jame funkcionalne enote E2, pri čemer se upošteva varnost po Eurocodu 7. Dane geološko geotehnični podatki so bili povzeti na podlagi Poročila o geološko – geomehanskih in hidroloških raziskavah (št. Načrta ic 209/17, 17.5.2017).

SLIKA 1: OBMOČJE ZAŠČITE GRADBENE JAME

2 OPIS OBSTOJEČEGA STANJA

Na lokaciji, kjer bo potekala izgradnja predvidenega novega objekta bo zaradi garažne hiše, potrebno izvesti izkop do cca 5,00 m globoko, zato bo potrebno narediti zaščito brežin gradbene jame pred porušitvijo.

Obravnavana lokacija se nahaja na območju opuščenega glinokopa. Na severni strani je območje omejeno s funkcionalno enoto E1, na vzhodni strani je teren porasel z grmičevjem, na zahodni strani je omejen s Potjo rdečega križa. Teren je v večini raven. Trenutno to območje ni v uporabi, služi večinoma kot odlagališče gradbenega materiala.

Za zaščito gradbene jame smo na podlagi geološko geomehanskih razmer predvideli izvedbo odprtega izkopa v naklonu 1:2, kjer to omogoča prostor kjer pa to ni mogoče bomo zaščito izvedli z zagatnicami in sicer na zahodnem delu samo zagatnice dolžine 10,00 m na vzhodni strani pa bo vsaka četrta zagatnica dolžine 8,00 m še sidrana na globini -2,00m. Zaščita gradbene jame bo odmaknjena za 1,00 m od objekta, kjer je to mogoče ter bo potekala naokoli funkcionalne enote E2. Natančen potek zaščite gradbene jame je prikazan v risbi Situacija, G.1. Odmik zaščite od roba gradbene jame je podal naročnik.

3 GEOLOŠKO – GEOTEHNIČNE RAZMERE

Izdelano je bilo Poročila o geološko – geomehanskih in hidroloških raziskavah (št. Načrta ic 209/17, 17.5.2017). Same raziskave so obsegale 15 sondažnih vrtin v vrtinah so bili izvedeni tudi standardni penetracijski preizkusi (128 kom), izvedbo meritev z Menardovim presiometrom (30 kom), meritve dinamične oz. statične penetracije DP/CPT (5 kom), meritve nosilnosti tal CBR v razkopih (10 kom), geološko-geotehnična spremljava vrtalnih del in razkopov, preiskave vzorcev zemljin v geomehanskem laboratoriju, izdelavo treh piezometrov, izvedbo hidravličnih poskusov v piezometrih (3 × večstopenjski črpalni, 3 × daljši črpalni poskus, 2 × ponikovalni poskus) ter vgradnjo pieozometrskih sond za kontinuirano merjenje nivoja podzemne vode v obdobju 9 mesecev.

Karakteristične vrednosti geomehanskih parametrov posameznih plasti so podane v Geotehničnem poročilu in sicer so sledeče:

Geološka plast	Prostor. teža	Kohezija	Strižni kot
	γ	c	φ
	[kN/m^3]	[kN/m^2]	[°]
Prodnat nasip	20	0	28-33
Meljno peščene zemljine	19	6,5	18,4
Prodno peščene zemljine	21	0	39

Za potrebe projektiranja smo privzeli konzervativne vrednosti.

IG0 = nasip glinastega in meljastega proda in grušča s plastmi gline
IG1 = sloj gline s prehodi v melje in meljaste peske
IG2 = peščene, meljaste in glinasti srednje do zelo gosti prodi

4 PROJEKTNE OSNOVE

Projekt novo gradnjo stanovanjske soseske Novo Brdo v območju urejene OPPN 252, funkcionalne enote E2 za vsebuje naslednje elemente:

- Projekt za zaščito gradbene jame za potrebe garažne hiše.

Glede na razpoložljive podatke menimo, da je potrebno zaščito gradbene jame izvesti tako, da bo zagotovljena varnost ter da bodo pomiki v skladu s projektiranjem po Eurocodu 7. Zato na podlagi geotehničnega poročila predvidimo za zaščito gradbene jame naslednje ukrepe:

- Severni del: odprti izkop v naklonu 1:2
- Vzhodni del: Zagatnice dolžine 8m, vsaka četrta zagatnica je sidrana s sidrom dolžine 12m (ob obstoječi brežini)
- Zahodni del: Zagatnice dolžine 10m
- Južni del: Odprti izkop v naklonu 1:3 (meja z nadaljevanjem gradnje sklopa E3)

5 FAZE IZVEDBE

Celotno območje bo razdeljeno na tri dele i sicer bosta severni in južni izkop obsegala odprti izkop, medtem ko bo vzhodni del obsegal zagatnice in sidra, zahodni del pa samo zagatnice.

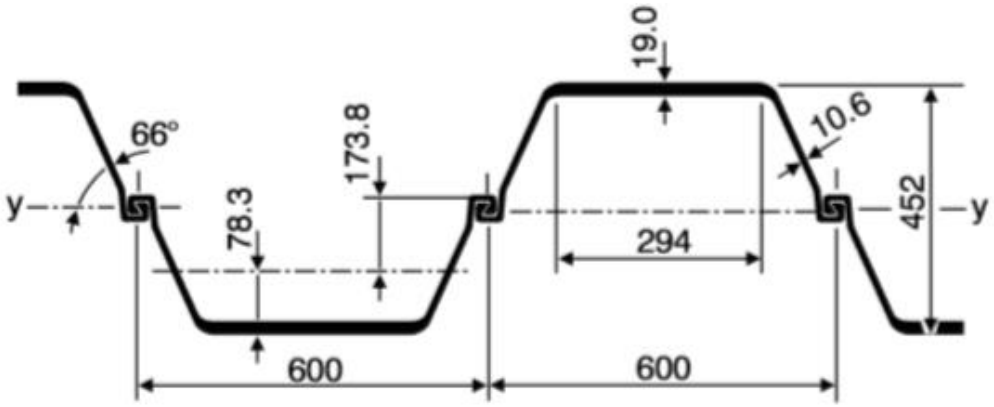
Dela pri zaščiti gradbene jame se izvajajo po naslednjem vrstnem redu:

- Izvede se geodetska zakoličba poteka osi zaščite gradbene jame (zakoličbo naj izvajalec potrdi z vpisom v gradbeni dnevnik).

- Izvajalec mora pred pričetkom izvedbe preveriti lokacijo in potek vseh komunalnih in energetskih vodov tako, da ustrezne pooblaščene organizacije (upravljavci oziroma pogodbeni vzdrževalci) potrdijo potek le teh. Prestavitev le teh ni predmet tega projekta.

5.1 ZAGATNICE – ZAHODNI DEL

Izvajalec naj uporabi zagatnice Larssen tipa 607 n ali tip, ki ima vsaj enake nosilne karakteristike, vendar ga mora najprej odobriti geotehnični nadzor.



	W_y cm³	W_y cm³	kg/m	cm²	cm	m²/m	S_y cm³	I_y cm⁴	i_y cm	Steel grades S240GP	S270GP	S355GP	S390GP	S430GP
Wall	3200	3620	190	241.7	293	2.93	1810	72320	17.30	2	2	2	2	2
E	649	–	114	145.0	203	1.91	–	11280	8.73	–	–	–	–	–
D	3840	–	228	290.0	380	3.67	–	86790	17.30	–	–	–	–	–
Dr	4330	–	342	435.0	554	5.43	–	119400	16.55	–	–	–	–	–

Gradbeno jamo je potrebno predhodno zaščititi z zagatnicami tip 607 n dolžine10 m, ki morajo biti zabite v tla do višine obstoječe površine oziroma vsaj 5 m pod nivo izkopa. Zagatnice se izvedejo pred začetkom izkopnih del. Izvajalec lahko vgradi tudi daljše zagatnice, vendar naj jih vgradi samo do

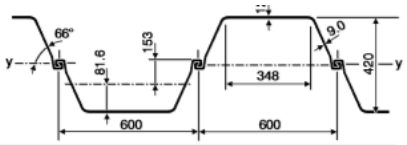
predvidene globine. Pred pričetkom izvedbe zagatne stene je potrebno izvesti poskusno zabijanje za določitev optimalnega načina zabijanja zagatnic.

Zagatnice je nujno izvesti po pravilu stroke oziroma jih pravilno zakleniti .

5.2 SIDRANE ZAGATNICE – VZHODNI DEL

Izvajalec naj uporabi zagatnice Larssen tipa 605 ali tip, ki ima vsaj enake nosilne karakteristike, vendar ga mora najprej odobriti geotehnični nadzor. Zagatnice so dolžine 8,00 m. Pri čemer je vsaka četrta zagatnica sidrana, kar pomeni na 2,40 m. Gre za IBO sidra nosilnosti 350 kN, dolžine 12 m, pod kotom 5^{o} na globini -2,00 m.

LARSSEN 605



Wall	2020	2340	139.2	177.3	290	2.90	1170	42420	15.47	2	2	2	2	3
E	520	–	83.5	106.4	200	1.88	–	7910	8.62	–	–	–	–	–
D	2420	–	167.0	212.8	374	3.62	–	50900	15.47	–	–	–	–	–
Dr	2790	–	250.5	319.2	548	5.36	–	70510	14.86	–	–	–	–	–

Pred pričetkom izvedbe zagatne stene je potrebno izvesti poskusno zabijanje za določitev optimalnega načina zabijanja zagatnic.

Nas mestu križanja začasnih geotehničnih sider se le ta izvedejo na dva različna nivoja, eden na 2,0m globine in pod kotom 5^{o} in drugi na 2,5m globine in pod kotom 10^{o}.

Zagatnice je nujno izvesti po pravilu stroke oziroma jih pravilno zakleniti.

5.3 SEVERNI IN JUŽNI DEL – ODPRTI IZKOP

Južni del zaščite gradbene jame se izkoplje v naklonu 1:2, medtem ko se proti južnemu delu izvaja izkop v naklonu 1:3. Izkop je potrebno izvesti pod nadzorom in skladno z navodili geotehničnega nadzora. Predvidevamo da bo brežina med fazama E2 in E3 bila odprta daljši čas.

5.4 IZKOPI

Razen kjer je to določeno z projektom se lahko izkopi pri izvedbi začasne zaščite gradbene jame se izvajajo z uporabo težke gradbene mehanizacije. Izkop in odvažanje izkopanine je možno izvajati na več načinov, odvisen pa je od možnosti dostopa, razpoložljivega prostora, omejitev za gradbena dela na naseljenem območju ter drugih pogojev.

Pri izvedbi izkopa mora Izvajalec po celotnem obodu gradbene jame predvideti, da bo za vgradnjo zaščitnih elementov potreboval vsaj 10 m širok plato na nivoju vgradnje zaščitnih elementov. Plato se mora po končani izvedbi zaščitnih elementov odstraniti.

Izkop se lahko izvede samo takrat, ko je zagatna stena izdelana po celotnem obodu. Izkop naj se izvede najprej do globine 2 m, preostali izkop naj se izvede tako, da se v gradbeni jami izkop razporedi približno na četrtine, vsaka v dolžini 10 m in celotni širini. Najprej naj se izvede prva in tretja četrtina izkopa, nato pa naj se opazuje odziv zagatne stene oziroma njene pomike. Če so v mejah normale, bo s soglasjem geotehničnega nadzora dovoljen izkop do končne kote po celotni gradbeni jami.

Izkopi se bodo izvajali v zemljini II. In III. Zemeljske kategorije. Voda naj se iz gradbene jame črpa v kolikor se le ta pojavi.

6 GEOSTATIČNI IZRAČUN

Izvedeni so bili trije izračuni in sicer s programoma Slde, Phase in Larix:

1. Preverba situacije odprte izkopa v naklonu 1:2 in naklon 2:3. Ugotovili smo sledeče in sicer da pri izkopu 2:3 se nam pojavijo površinske porušnice, kar bi zahtevalo dodaten ukrep in sicer bi morali površje izkopa zaščititi s torketom. Če pa je naklon odprtega izkopa 1:2 ni potreben dodaten izkop in so tudi površinske porušnice zadovoljive.
2. Preverba če so potrebna sidra na strani kjer se dviguje obstoječa brežina 7,0 do 9,0 m. Ko smo predpostavili, da ne bi bila sidrana vsaka četrta zagatnica, smo dobili nezadovoljivo varnost, ki je zahtevana po Evrocode 7. Ko smo dodali IBO sidro na vsako četrto zagatnico, smo dobili varnost >1,0 kot je to zahtevano.
3. Pri preverbi ali so 10.0 m dolge zagatnice zadovoljiva zaščita na zahodni strani, smo ugotovili, da je varnost primerna.

Vsi izračuni so razvidni iz prilog.

7 MONITORNING

Med samo zaščito gradbene jame je potrebno spremljati pomike zagate stene. V ta namen se na zagatno steno pritrdijo reperne točke za geodetsko opazovanje premikov. Skupno predvidevamo vgradnjo 5 reperjev.

Ničelno meritev na točkah na objektih je potrebno izvesti pred začetkom izkopa. Prav tako je potrebno pred pričetkom gradnje izvesti popis stanja vseh objektov, vključno z najbližjimi komunalnimi vodi. Na objektih je potrebno izvesti vsaj en do dva repera za določanje pomikov. Med izvajanjem izkopa je potrebno izvesti vsaj 6 meritev na bližnjih objektih, po potrebi pa več.

Geodetsko opazovanje repernih točk se mora izvajati redno. V nadaljevanju naj se meritve vršijo po enem tednu, po dveh tednih in nato enkrat mesečno. Meritve se naj izvajajo do zapiranja 2/3 gradbene jame. V primeru, da se opazijo oziroma evidentirajo premiki, je potrebno meritve zgostiti.

8 POSEBNI VARNOSTNI UKREPI

Razen običajnih varnostnih ukrepov pri izvajanju tovrstnih objektov je skladno z napredovanjem izkopov in izvedbi gradbenih del v gradbeni jami nujno upoštevati še:

- pri izkopu je nujno pregledovati površino brežine, da ne pride do lokalnih previsov, vsa brežina mora biti v naklonu = 90°, razen odprtega izkopa, ki je v nagibu 1:2
- na dnu gradbene jame morajo biti delavci ustrezno zaščiteni pred vsipom in padcem kosov zemljine (jeklene mreže, varovalni odri, osebna varovalna sredstva)
- vodstvo izvajanja del mora vsak dan pred pričetkom del pregledati brežine in odstraniti eventualne nevarne dele zemljine
- rob gradbene jame mora biti ustrezno zavarovan s predpisanimi ograjami in namestitvami ustreznih opozorilnih znakov, brez dodatnih obremenitev

9 VPLIV NA OKOLJE

Zaščita gradbene jame nima nobenega dejanskega učinka na okolje. Vpliv lahko sodi v normalno gradbeno delo, ker gradbena mehanizacija, ki delo izvaja ni nič drugačna od običajnih pri izvedbi gradbenih del, razen onesnaževanja, ki nastane pri gradbenih delih (gradbeni odpadki). Izvajalci so dolžni gradbene odpadke odstraniti skladno s slovensko zakonodajo.

10 NADZOR

Nadzor izvedbe mora obsegati pregled ustreznosti izvajanja zagatnic, sidranih zagatnic, zaščite gradbene jame ter izkopov (odprti izkop in izkop gradbene jame).
Pri izvedbi vkopov in ostalih zemeljskih delih pri predvideni izgradnji je obvezna prisotnost geotehnika (stalen geotehnični nadzor), ki bo dajal navodila za ustrezne posege in eventualne dodatne ukrepe pri izvedbi le teh.
V primeru večjih odstopanj od projekta, je potrebno obvestiti projektantski in geomehanski nadzor.

11 ZAKLJUČEK

Pred pričetkom izvedbe je potrebno ponovno preveriti mikrolokacijo obstoječih komunalnih in energetskih naprav in napeljav. Eventualna prestavitev obstoječe in predvidene komunalne infrastrukture ni predmet tega projekta.

Vsi detajli izvedbe, situativni niveletni potek so razvidni iz grafičnih prilog.

Le ob kompleksnem upoštevanju vseh faktorjev, ki vplivajo na varnost in kakovost izvedbe del, določenih s tem projektom, lahko projektant in projektna organizacija odgovarjata za vsa opravljena dela pri projektiranju in končni izvedbi zaščite temeljnih tal.

Zaščita gradbene jame je začasna in omejena na 120 dni od časa izkopa le te.

Če se bo izvajalo v fazah, najprej Funkcionalna enota E3 in nato Funkcionalna enota E2, se med njimi izvede odprti izkop v nagibu 1:3.

Objekt: **»STANOVANJSKA SOSESKA NOVO BRDO V OBMOČJU UREJANJA OPPN 252, FUNKCIONALNA ENOTA E2 – Zaščita gradbene jame«**

Vrsta projektne dokumentacije: **Načrt izkopa in osnovne podgradnje za podzemne objekte**

G. RISBE

		Risbe	**G**
		Situacija	G.1
		Prečni prerez - severni	G.2
		Prečni prerez - zahod	G.3
		Prečni prerez - vzhod	G.4

Objekt: **»STANOVANJSKA SOSESKA NOVO BRDO V OBMOČJU UREJANJA OPPN 252, FUNKCIONALNA ENOTA E2 – Zaščita gradbene jame«**

Vrsta projektne dokumentacije: **Načrt izkopa in osnovne podgradnje za podzemne objekte**

P. GEOSTATIČNI IZRAČUNI

		Geostatični izračuni	**P.**
		Geostatični izračuni	P.1.-P.6.

SYSTEM

Stages

Nb	Title
1	Final state

Excavation support walls

Wall type	Parameters δ_a	Parameters δ_p	Top of wall x [m]	Top of wall y [m]	Inclination α [°]	
Closed	0,67	-0,50	0	0	0	

δ_a : Active wall friction angle as fraction of soil friction angle for determining the active earth pressure coefficients
δ_p : Passive wall friction angle as fraction of soil friction angle for determining the earth resistance coefficients

Wall system cross section: sheet pile wall

Description	Parameters Value	Unit	
Profile	LARSSEN 607 n		
Sheet pile steel	S240GP		
Statical action	Double plank		
Bending stiffness EI	151872	[kNm²/m]	

Ground surface

Level y [m]	Variation	Vertical surcharge Description	Action	p [kN/m²]	As e. pr.
0	Horizontal			0	No

As e. pr. : Earth pressure due to surcharge treated as usual earth pressure (redistribution, min. earth pressure, load factor)

Soil layers

Description	Level y [m]	Parameters φ [°]	Parameters γ [kN/m³]	Parameters c_a [kN/m²]	Further attributes c_p [kN/m²]	k [m/s]	γ' [kN/m³]	K_{ah} [-]	K_{0h} [-]	K_{ph} [-]
IG 0	0	28,00	20,00	0,00						
IG 1	-1,40	18,40	19,00	6,50						
IG 2	-6,40	39,00	21,00	0,00						

c_a : Cohesion of soil layer to determine earth pressure
c_p : Cohesion of soil layer to determine earth resistance
k : Permeability of soil layer
γ' : Quoyant unit weight of soil (without seepage force)

LOAD CASE PO: Prometna obteba (Superimposed dead loads), Stage Final state

Concentrated loads on soil

Coordinates x [m]	Coordinates y [m]	Load values P_x [kN/m]	Load values P_y [kN/m]	Load values M_z [kNm/m]	As e. pr.	
0,95	0		-21,00		No	
2,20	0		-21,00		No	

As e. pr. : Excess earth pressure treated as usual earth pressure (redistribution, min. earth pressure, load factor)

Limit state values

Wall length

Stage	y [m]	t [m]	Base [m]	Values from
1	-9,39	4,39	-5,00	Stage 1, !Ultimate LS type 2, AC 1

y : Depth of bottom of wall
t : Depth of embedment
Base : Level of excavation base

Dimensioning of sheet pile wall

Verification		Dimensioning			
aMax [-]	St,LSS,AC	Profile	aMax [-]	St,LSS,AC	Remarks
1,47	1, 2, 1	LARSSEN 607 n	**1,47**	1, 2, 1	Required profile inadequate!

Verification : Verification for selected section profile: LARSSEN 607 n, Double plank
aMax : Maximum load factor (degree of exploitation), aMax <= 1.0 -> OK
St,LSS,AC : Stage, Limit state specification, Action combination
LSS 1 = !Serviceability LS occasional,
LSS 2 = !Ultimate LS type 2

Axial force with corresponding components

	Nd1 max				Nd1 min				
y [m]	Nd1 [kN/m]	Vd1 [kN/m]	Md1 [kNm/m]	St,LSS,AC	Nd1 [kN/m]	Vd1 [kN/m]	Md1 [kNm/m]	St,LSS,AC	
0	0	0,00	0,00	1, 2, 1	0	0,00	0,00	1, 2, 1	
-0,48	-0,57	-1,67	0,40	1, 2, 2	-1,09	-3,23	0,77	1, 2, 1	
-0,82	-1,86	-5,51	1,63	1, 2, 4	-3,37	-9,98	3,04	1, 2, 1	
-1,15	-3,16	-9,35	4,03	1, 2, 4	-5,68	-16,80	7,36	1, 2, 1	
-1,40	-4,68	-13,86	6,97	1, 2, 4	-8,36	-24,73	12,63	1, 2, 1	
-1,52	-5,09	-15,71	8,72	1, 2, 4	-9,06	-27,97	15,73	1, 2, 1	
-1,62	-5,44	-17,35	10,40	1, 2, 4	-9,68	-30,83	18,73	1, 2, 1	
-2,12	-6,56	-22,47	20,29	1, 2, 4	-11,71	-40,15	36,35	1, 2, 1	
-2,62	-8,00	-29,11	33,13	1, 2, 4	-14,37	-52,39	59,36	1, 2, 1	
-3,12	-9,77	-37,26	49,65	1, 2, 4	-17,67	-67,55	89,23	1, 2, 1	
-3,36	-10,74	-41,71	59,12	1, 2, 4	-19,47	-75,87	106,42	1, 2, 1	
-3,86	-12,50	-49,79	81,93	1, 2, 4	-22,87	-91,46	148,13	1, 2, 1	
-4,36	-14,58	-59,40	109,17	1, 2, 4	-26,89	-109,98	198,37	1, 2, 1	
-4,86	-17,00	-70,51	141,58	1, 2, 4	-31,55	-131,42	258,60	1, 2, 1	
-5,00	-17,74	-73,91	151,72	1, 2, 4	-32,98	-137,96	277,51	1, 2, 1	
-5,50	-19,98	-81,36	190,78	1, 2, 4	-35,22	-145,41	348,60	1, 2, 1	
-5,88	-21,12	-83,07	222,17	1, 2, 4	-36,36	-147,12	404,35	1, 2, 1	
-6,38	-21,89	-80,11	263,21	1, 2, 4	-37,13	-144,17	477,42	1, 2, 1	
-6,40	-21,90	-79,88	264,77	1, 2, 4	**-37,14**	-143,93	480,24	1, 2, 1	
-6,90	12,60	22,09	280,75	1, 2, 4	-2,64	-41,97	528,24	1, 2, 1	
-7,40	59,93	160,64	236,59	1, 2, 4	44,69	96,59	516,11	1, 2, 1	
-7,90	120,09	335,79	114,00	1, 2, 4	104,85	271,73	425,55	1, 2, 1	
-8,19	160,46	453,00	0,96	1, 2, 4	146,79	393,42	317,92	1, 2, 1	
-8,36	183,97	518,30	0,69	1, 2, 2	172,67	468,49	251,52	1, 2, 1	
-8,40	181,34	496,50	150,90	1, 2, 3	177,83	483,46	238,28	1, 2, 1	
-8,67	225,89	625,47	0,32	1, 2, 3	223,33	615,18	81,93	1, 2, 1	
-8,81	**247,01**	683,71	0,60	1, 2, 1	247,01	683,71	0,60	1, 2, 1	

St,LSS,AC : Stage, Limit state specification, Action combination
LSS 1 = !Serviceability LS occasional,
LSS 2 = !Ultimate LS type 2

Shear force with corresponding components

	Vd1 max				Vd1 min				
y [m]	Vd1 [kN/m]	Nd1 [kN/m]	Md1 [kNm/m]	St,LSS,AC	Vd1 [kN/m]	Nd1 [kN/m]	Md1 [kNm/m]	St,LSS,AC	
0	0,00	0	0,00	1, 2, 1	-0,00	0	-0,00	1, 2, 3	
-0,48	-1,67	-0,57	0,40	1, 2, 2	-3,23	-1,09	0,77	1, 2, 3	
-0,82	-5,51	-1,86	1,63	1, 2, 4	-9,98	-3,37	3,04	1, 2, 1	
-1,15	-9,35	-3,16	4,03	1, 2, 4	-16,80	-5,68	7,36	1, 2, 1	
-1,40	-13,86	-4,68	6,97	1, 2, 4	-24,73	-8,36	12,63	1, 2, 1	
-1,52	-15,71	-5,09	8,72	1, 2, 4	-27,97	-9,06	15,73	1, 2, 1	
-1,62	-17,35	-5,44	10,40	1, 2, 4	-30,83	-9,68	18,73	1, 2, 1	
-2,12	-22,47	-6,56	20,29	1, 2, 4	-40,15	-11,71	36,35	1, 2, 1	
-2,62	-29,11	-8,00	33,13	1, 2, 4	-52,39	-14,37	59,36	1, 2, 1	
-3,12	-37,26	-9,77	49,65	1, 2, 4	-67,55	-17,67	89,23	1, 2, 1	
-3,36	-41,71	-10,74	59,12	1, 2, 4	-75,87	-19,47	106,42	1, 2, 1	
-3,86	-49,79	-12,50	81,93	1, 2, 4	-91,46	-22,87	148,13	1, 2, 1	
-4,36	-59,40	-14,58	109,17	1, 2, 4	-109,98	-26,89	198,37	1, 2, 1	
-4,86	-70,51	-17,00	141,58	1, 2, 4	-131,42	-31,55	258,60	1, 2, 1	
-5,00	-73,91	-17,74	151,72	1, 2, 4	-137,96	-32,98	277,51	1, 2, 1	
-5,50	-81,36	-19,98	190,78	1, 2, 4	-145,41	-35,22	348,60	1, 2, 1	
-5,88	-83,07	-21,12	222,17	1, 2, 4	**-147,12**	-36,36	404,35	1, 2, 1	
-6,38	-80,11	-21,89	263,21	1, 2, 4	-144,17	-37,13	477,42	1, 2, 1	
-6,40	-79,88	-21,90	264,77	1, 2, 4	-143,93	-37,14	480,24	1, 2, 1	
-6,90	22,09	12,60	280,75	1, 2, 4	-41,97	-2,64	528,24	1, 2, 1	
-7,40	160,64	59,93	236,59	1, 2, 4	96,59	44,69	516,11	1, 2, 1	
-7,90	335,79	120,09	114,00	1, 2, 4	271,73	104,85	425,55	1, 2, 1	
-8,19	453,00	160,46	0,96	1, 2, 4	393,42	146,79	317,92	1, 2, 1	
-8,36	518,30	183,97	0,69	1, 2, 2	468,49	172,67	251,52	1, 2, 1	
-8,40	496,50	181,34	150,90	1, 2, 3	483,46	177,83	238,28	1, 2, 1	
-8,67	625,47	225,89	0,32	1, 2, 3	615,18	223,33	81,93	1, 2, 1	
-8,81	**683,71**	247,01	0,60	1, 2, 1	683,71	247,01	0,60	1, 2, 1	

St,LSS,AC : Stage, Limit state specification, Action combination
LSS 1 = !Serviceability LS occasional,
LSS 2 = !Ultimate LS type 2

Bending moment with corresponding components

y [m]	Md1 max Md1 [kNm/m]	Nd1 [kN/m]	Vd1 [kN/m]	St,LSS,AC	Md1 min Md1 [kNm/m]	Nd1 [kN/m]	Vd1 [kN/m]	St,LSS,AC
0	0,00	0	0,00	1, 2, 1	**-0,00**	0	-0,00	1, 2, 3
-0,48	0,77	-1,09	-3,23	1, 2, 1	0,40	-0,57	-1,67	1, 2, 4
-0,82	3,04	-3,37	-9,98	1, 2, 1	1,63	-1,86	-5,51	1, 2, 4
-1,15	7,36	-5,68	-16,80	1, 2, 1	4,03	-3,16	-9,35	1, 2, 4
-1,40	12,63	-8,36	-24,73	1, 2, 1	6,97	-4,68	-13,86	1, 2, 4
-1,52	15,73	-9,06	-27,97	1, 2, 1	8,72	-5,09	-15,71	1, 2, 4
-1,62	18,73	-9,68	-30,83	1, 2, 1	10,40	-5,44	-17,35	1, 2, 4
-2,12	36,35	-11,71	-40,15	1, 2, 1	20,29	-6,56	-22,47	1, 2, 4
-2,62	59,36	-14,37	-52,39	1, 2, 1	33,13	-8,00	-29,11	1, 2, 4
-3,12	89,23	-17,67	-67,55	1, 2, 1	49,65	-9,77	-37,26	1, 2, 4
-3,36	106,42	-19,47	-75,87	1, 2, 1	59,12	-10,74	-41,71	1, 2, 4
-3,86	148,13	-22,87	-91,46	1, 2, 1	81,93	-12,50	-49,79	1, 2, 4
-4,36	198,37	-26,89	-109,98	1, 2, 1	109,17	-14,58	-59,40	1, 2, 4
-4,86	258,60	-31,55	-131,42	1, 2, 1	141,58	-17,00	-70,51	1, 2, 4
-5,00	277,51	-32,98	-137,96	1, 2, 1	151,72	-17,74	-73,91	1, 2, 4
-5,50	348,60	-35,22	-145,41	1, 2, 1	190,78	-19,98	-81,36	1, 2, 4
-5,88	404,35	-36,36	-147,12	1, 2, 1	222,17	-21,12	-83,07	1, 2, 4
-6,38	477,42	-37,13	-144,17	1, 2, 1	263,21	-21,89	-80,11	1, 2, 4
-6,40	480,24	-37,14	-143,93	1, 2, 1	264,77	-21,90	-79,88	1, 2, 4
-6,90	**528,24**	-2,64	-41,97	1, 2, 1	280,75	12,60	22,09	1, 2, 4
-7,40	516,11	44,69	96,59	1, 2, 1	236,59	59,93	160,64	1, 2, 4
-7,90	425,55	104,85	271,73	1, 2, 1	114,00	120,09	335,79	1, 2, 4
-8,19	317,92	146,79	393,42	1, 2, 1	0,96	160,46	453,00	1, 2, 4
-8,36	251,52	172,67	468,49	1, 2, 1	0,69	183,97	518,30	1, 2, 2
-8,40	238,28	177,83	483,46	1, 2, 1	150,90	181,34	496,50	1, 2, 3
-8,67	81,93	223,33	615,18	1, 2, 1	0,32	225,89	625,47	1, 2, 3
-8,81	0,60	247,01	683,71	1, 2, 1	0,60	247,01	683,71	1, 2, 1

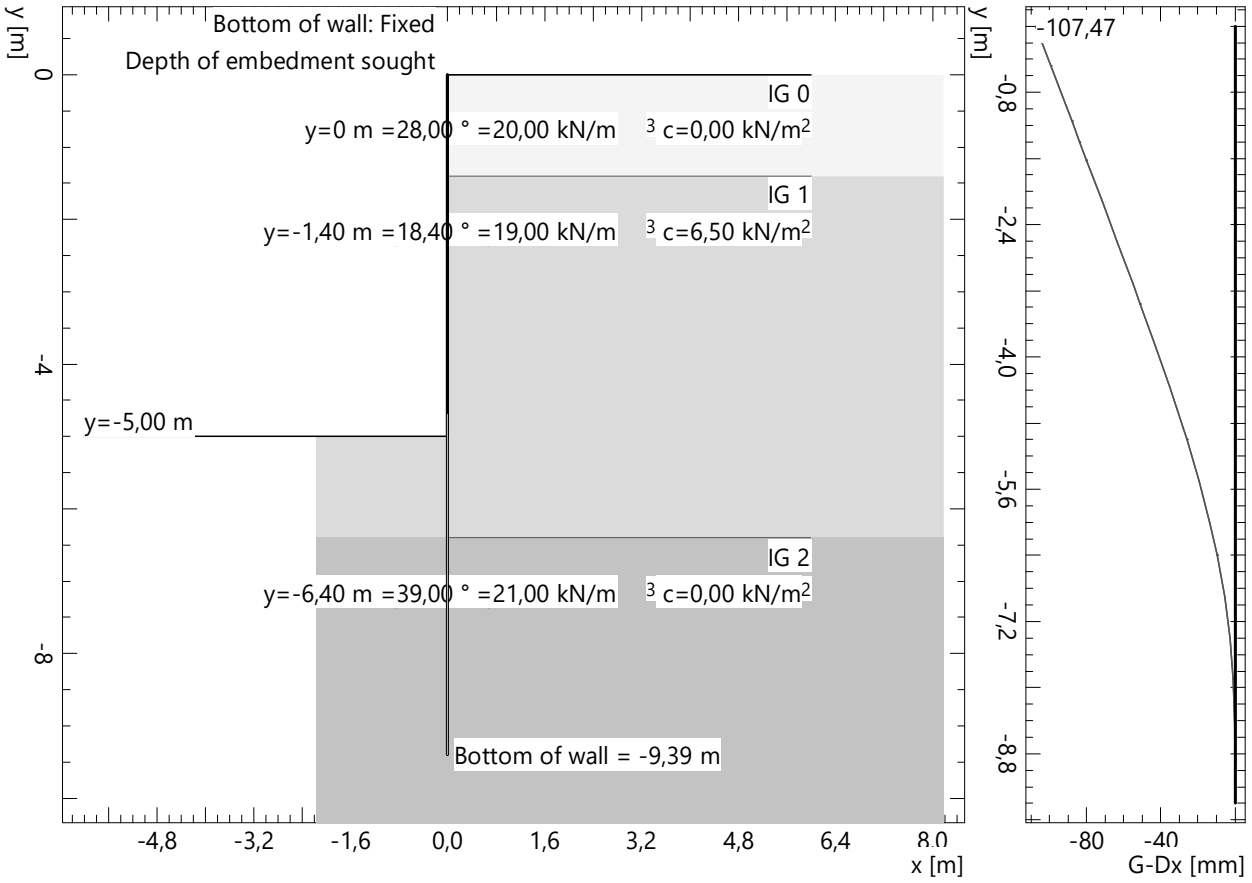
St,LSS,AC : Stage, Limit state specification, Action combination
LSS 1 = !Serviceability LS occasional,
LSS 2 = !Ultimate LS type 2

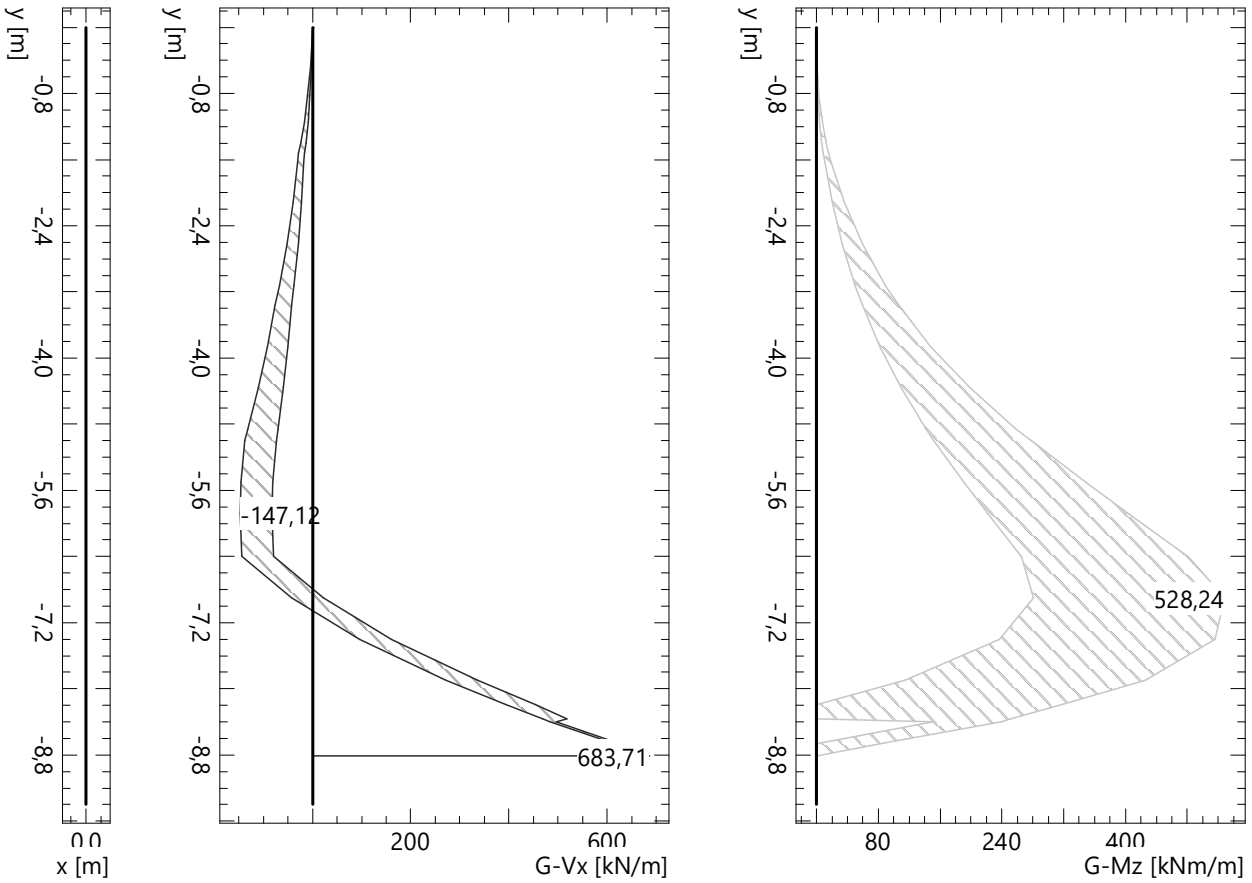
Deformations

y [m]	Dx max Dx [mm]	St,LSS,AC	Dx min Dx [mm]	St,LSS,AC
0	-107,47	1, 1, 1	**-107,47**	1, 1, 1
-0,48	-99,36	1, 1, 1	-99,36	1, 1, 1
-0,48	-99,36	1, 1, 1	-99,36	1, 1, 1
-0,98	-90,89	1, 1, 1	-90,89	1, 1, 1
-1,15	-88,06	1, 1, 1	-88,06	1, 1, 1
-1,15	-88,06	1, 1, 1	-88,06	1, 1, 1
-1,40	-83,75	1, 1, 1	-83,75	1, 1, 1
-1,40	-83,75	1, 1, 1	-83,75	1, 1, 1
-1,62	-80,03	1, 1, 1	-80,03	1, 1, 1
-1,62	-80,03	1, 1, 1	-80,03	1, 1, 1
-2,12	-71,59	1, 1, 1	-71,59	1, 1, 1
-2,62	-63,20	1, 1, 1	-63,20	1, 1, 1
-3,12	-54,93	1, 1, 1	-54,93	1, 1, 1
-3,36	-51,01	1, 1, 1	-51,01	1, 1, 1
-3,36	-51,01	1, 1, 1	-51,01	1, 1, 1
-3,86	-42,99	1, 1, 1	-42,99	1, 1, 1
-4,36	-35,26	1, 1, 1	-35,26	1, 1, 1
-4,86	-27,95	1, 1, 1	-27,95	1, 1, 1
-5,00	-25,99	1, 1, 1	-25,99	1, 1, 1
-5,00	-25,99	1, 1, 1	-25,99	1, 1, 1
-5,50	-19,38	1, 1, 1	-19,38	1, 1, 1
-6,00	-13,52	1, 1, 1	-13,52	1, 1, 1
-6,40	-9,49	1, 1, 1	-9,49	1, 1, 1
-6,40	-9,49	1, 1, 1	-9,49	1, 1, 1
-6,90	-5,54	1, 1, 1	-5,54	1, 1, 1
-7,40	-2,81	1, 1, 1	-2,81	1, 1, 1
-7,90	-1,11	1, 1, 1	-1,11	1, 1, 1
-8,40	-0,24	1, 1, 1	-0,24	1, 1, 1
-8,88	**0,00**	1, 1, 1	0,00	1, 1, 1

Dx : Displacements
St,LSS,AC : Stage, Limit state specification, Action combination
LSS 1 = !Serviceability LS occasional,
LSS 2 = !Ultimate LS type 2

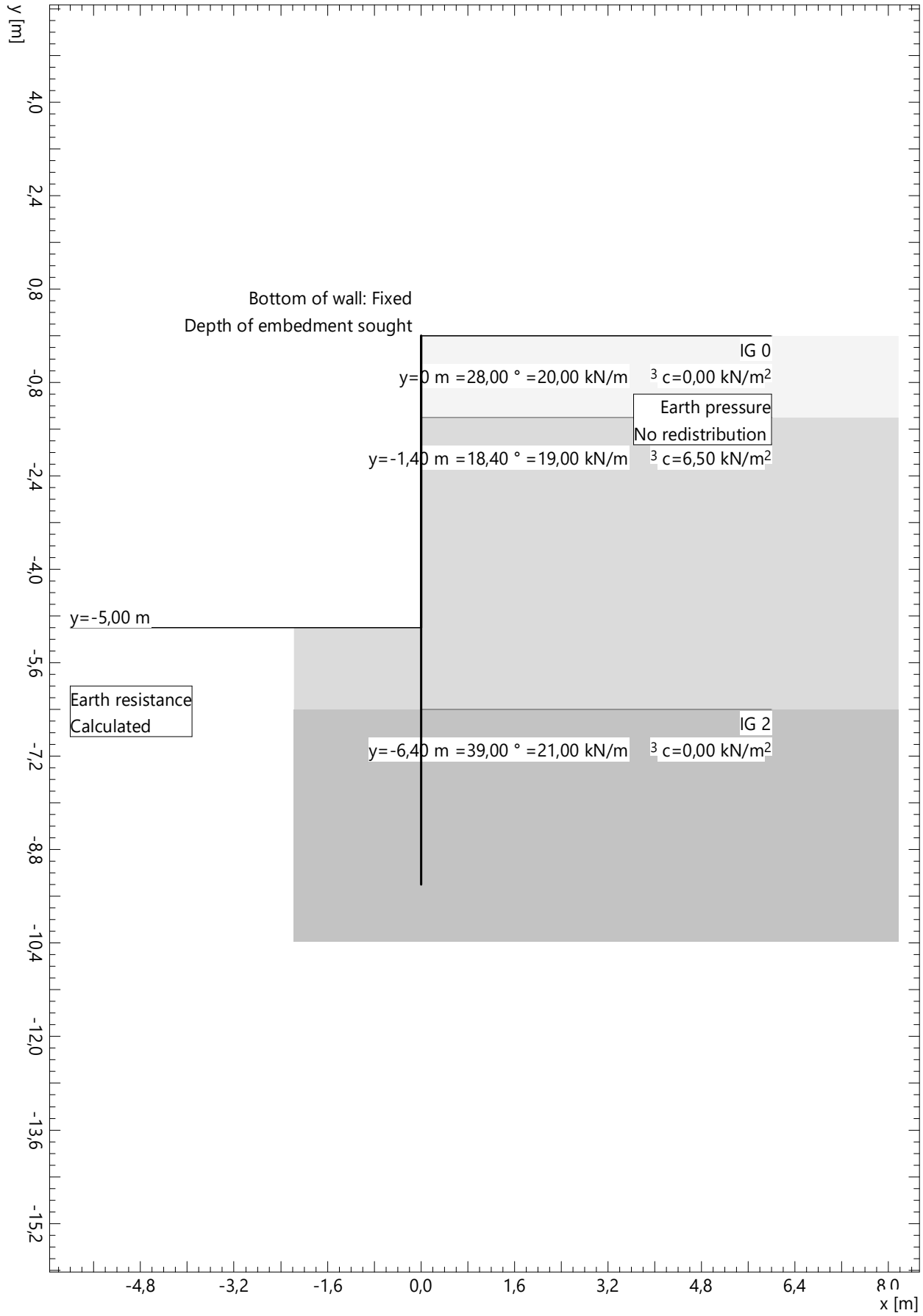
Limit state values graphic





Nr.:

Limit state values graphic



Nr.:

GEOTECHNICAL MODEL

Soil layer attributes

Id	Description	φ_k [°]	γ_k [kN/m^3]	c_k [kN/m^2]	
M1	IG 0	28,00	20,00	0,00	
M2	IG 1	18,40	19,00	6,50	
M3	IG 2	39,00	21,00	0,00	

Shear resistances

Parameters			Geometry				
W_1 [kN/m]	W_2 [kN/m]	L_E [m]	x_1 [m]	y_1 [m]	x_2 [m]	y_2 [m]	
1,00	1,00	5,00	0,00	0	0,00	-9,39	

L_E : Length of transmission zone

LOAD CASE PO: Prometna obteba (Superimposed dead loads)

Line loads

Coordinates		Load values			M_{active}	
x [m]	y [m]	P_x [kN/m]	P_y [kN/m]	M_z [kNm/m]		
0,95	0	0	-21,00	0	Yes	
2,20	0	0	-21,00	0	Yes	

Limit state values: Definition with centres and constraint line

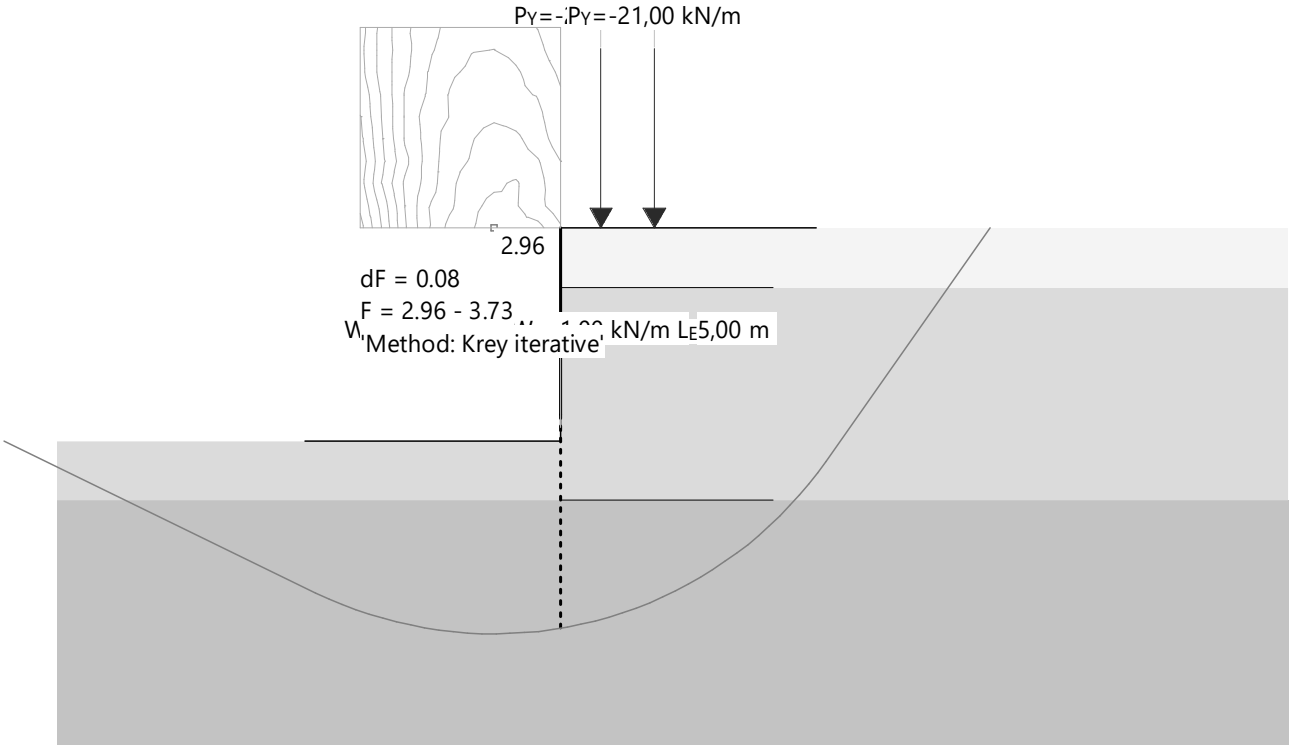
Slip circles with minimum safeties

LSS	AC	Circle No.	x [m]	y [m]	R [m]	Anchor	F_{ex} [-]	L_{req} [m]	L_{min} [m]	Remark see footnotes	
1	1	7	-1,57	0	9,53		2,96				
		9	-0,52	0	9,42		2,99				
		8	-1,04	0	9,46		2,99				
		17	-1,57	0,52	10,05		2,99				

LSS : Limit state specification
AC : Action combinations
F_{ex} : existing safety, required safety F_{req} = 1.00
L_{req} : calculated required free anchor length between L_{min} - L_{max}
L_{min} : input minimum free anchor length

Loading PO: Prometna obteba
Limit state values: Critical slip surface, Definition with centres and constraint line

Scale 1 :177,6



Phase2 Analysis Information

Project Summary

File Name: SLIDE-Jama Brdo
Last saved with Phase2 version: 8.005
Analysis: Converted from Slide v7.009 with PHASE2 8.005

General Settings

Number of Stages: 5
Analysis Type: Plane Strain
Solver Type: Gaussian Elimination
Units: Metric, stress as kPa

Analysis Options

Maximum Number of Iterations: 500
Tolerance: 0.001
Number of Load Steps: Automatic
Convergence Type: Absolute Energy
Tensile Failure: Reduces Shear Strength
Joint tension reduces joint stiffness by a factor of 0.01

Strength Reduction Settings

Inital Estimate of SRF: 1
Step Size: Automatic
Tolerance (SRF): 0.01
Limit SSR Search Area: No
Apply SSR to Mohr-Coulomb Tensile Strength: Yes
Convergence Parameters: Automatic

Groundwater Analysis

Method: Piezometric Lines
Pore Fluid Unit Weight: 9.81 kN/m3
Probability: None

Field Stress

Field stress: gravity
Using actual ground surface
Total stress ratio (horizontal/vertical in-plane): 1
Total stress ratio (horizontal/vertical out-of-plane): 1
Locked-in horizontal stress (in-plane): 0
Locked-in horizontal stress (out-of-plane): 0

Mesh

Mesh type: graded
Element type: 3 noded triangles

Number of elements on Osnovno: 1239
Number of nodes on Osnovno: 671
Number of elements on Zagatnica: 1239
Number of nodes on Zagatnica: 671
Number of elements on Izkop1: 1157
Number of nodes on Izkop1: 630
Number of elements on Izkop2: 1069
Number of nodes on Izkop2: 586
Number of elements on Izkop3: 981
Number of nodes on Izkop3: 542

Mesh Quality

All elements are of good quality

Poor quality elements defined as:

Side length ratio (maximum / minimum) > 30.00
Minimum interior angle < 2.0 degrees
Maximum interior angle > 175.0 degrees

Reset Displacements

Displacements reset after: Osnovno

Areas of Excavated and Filled Elements

Izkop1

Material: IG0, Area Excavated: 12.037 m2

Izkop2

Material: IG1, Area Excavated: 15.685 m2

Izkop3

Material: IG1, Area Excavated: 15.269 m2

Excavation Areas

Original Un-deformed Areas

External Boundary Area: 215.856 m2
External Boundary Perimeter: 60.670 m

Osnovno

External Boundary Area: 215.718 m2 (-0.138592 m2 change from original area)
External Boundary Perimeter: 60.670 m (0.000892083 m change from original perimeter)

Zagatnica

External Boundary Area: 215.718 m2 (-0.138592 m2 change from original area)
External Boundary Perimeter: 60.670 m (0.000892083 m change from original perimeter)

Izkop1

External Boundary Area: 215.718 m2 (-0.138592 m2 change from original area)
External Boundary Perimeter: 60.670 m (0.000892083 m change from original perimeter)

Izkop2

External Boundary Area: 215.718 m2 (-0.138592 m2 change from original area)
External Boundary Perimeter: 60.670 m (0.000892083 m change from original perimeter)

Izkop3

External Boundary Area: 215.718 m2 (-0.138592 m2 change from original area)
External Boundary Perimeter: 60.670 m (0.000892083 m change from original perimeter)

Material Properties

Material: IG0

Color	
Initial element loading	field stress & body force
Unit weight	20 kN/m3
Elastic type	isotropic
Young's modulus	50000 kPa
Poisson's ratio	0.4
Failure criterion	Mohr-Coulomb
Peak tensile strength	0 kPa
Residual tensile strength	0 kPa
Peak friction angle	28 degrees
Peak cohesion	0 kPa
Material type	Plastic
Dilation Angle	0 degrees
Residual Friction Angle	28 degrees
Residual Cohesion	0 kPa
Piezo to use	None
Ru value	0

Material: IG1

Color	
Initial element loading	field stress & body force
Unit weight	19 kN/m3
Elastic type	isotropic
Young's modulus	50000 kPa
Poisson's ratio	0.4
Failure criterion	Mohr-Coulomb
Peak tensile strength	6.5 kPa
Residual tensile strength	0 kPa
Peak friction angle	18.4 degrees
Peak cohesion	6.5 kPa
Material type	Plastic
Dilation Angle	0 degrees
Residual Friction Angle	18.4 degrees
Residual Cohesion	6.5 kPa
Piezo to use	None
Ru value	0

Material: IG2

Color	
Initial element loading	field stress & body force
Unit weight	21 kN/m3
Elastic type	isotropic
Young's modulus	50000 kPa
Poisson's ratio	0.4
Failure criterion	Mohr-Coulomb
Peak tensile strength	0 kPa
Residual tensile strength	0 kPa
Peak friction angle	39 degrees
Peak cohesion	0 kPa
Material type	Plastic
Dilation Angle	0 degrees
Residual Friction Angle	39 degrees
Residual Cohesion	0 kPa
Piezo to use	None
Ru value	0

Shear Strength Reduction - Material Properties

Strength Reduction Factor: 1
Maximum Total Displacement: 0.0228971 m
Converged: yes

Material	IG0
Peak friction angle	28 degrees
Peak cohesion	0 kPa
Residual Friction Angle	28 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	18.4 degrees
Peak cohesion	6.5 kPa
Residual Friction Angle	18.4 degrees
Residual Cohesion	6.5 kPa

Material	IG2
Peak friction angle	39 degrees
Peak cohesion	0 kPa
Residual Friction Angle	39 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.3
Maximum Total Displacement: 0.0500578 m
Converged: yes

Material	IG0
Peak friction angle	22.2449 degrees
Peak cohesion	0 kPa
Residual Friction Angle	22.2449 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	14.3534 degrees
Peak cohesion	5 kPa
Residual Friction Angle	14.3534 degrees
Residual Cohesion	5 kPa

Material	IG2
Peak friction angle	31.9192 degrees
Peak cohesion	0 kPa
Residual Friction Angle	31.9192 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.5
Maximum Total Displacement: 0.0765621 m
Converged: yes

Material	IG0
Peak friction angle	19.518 degrees
Peak cohesion	0 kPa
Residual Friction Angle	19.518 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	12.5041 degrees
Peak cohesion	4.33333 kPa
Residual Friction Angle	12.5041 degrees
Residual Cohesion	4.33333 kPa

Material	IG2
Peak friction angle	28.3627 degrees
Peak cohesion	0 kPa
Residual Friction Angle	28.3627 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.7
Maximum Total Displacement: 0.111927 m
Converged: yes

Material	IG0
Peak friction angle	17.3681 degrees
Peak cohesion	0 kPa
Residual Friction Angle	17.3681 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	11.0717 degrees
Peak cohesion	3.82353 kPa
Residual Friction Angle	11.0717 degrees
Residual Cohesion	3.82353 kPa

Material	IG2
Peak friction angle	25.4705 degrees
Peak cohesion	0 kPa
Residual Friction Angle	25.4705 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.9
Maximum Total Displacement: 0.172311 m
Converged: yes

Material	IG0
Peak friction angle	15.6341 degrees
Peak cohesion	0 kPa
Residual Friction Angle	15.6341 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.9308 degrees
Peak cohesion	3.42105 kPa
Residual Friction Angle	9.9308 degrees
Residual Cohesion	3.42105 kPa

Material	IG2
Peak friction angle	23.0838 degrees
Peak cohesion	0 kPa
Residual Friction Angle	23.0838 degrees
Residual Cohesion	0 kPa

Critical Strength Reduction Factor: 2.1
Maximum Total Displacement: 0.438824 m
Converged: yes

Material	IG0
Peak friction angle	14.2084 degrees
Peak cohesion	0 kPa
Residual Friction Angle	14.2084 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.00129 degrees
Peak cohesion	3.09524 kPa
Residual Friction Angle	9.00129 degrees
Residual Cohesion	3.09524 kPa

Material	IG2
Peak friction angle	21.0872 degrees
Peak cohesion	0 kPa
Residual Friction Angle	21.0872 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 2.11
Maximum Total Displacement: 0.256165 m
Converged: no

Material	IG0
Peak friction angle	14.1438 degrees
Peak cohesion	0 kPa
Residual Friction Angle	14.1438 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	8.95932 degrees
Peak cohesion	3.08057 kPa
Residual Friction Angle	8.95932 degrees
Residual Cohesion	3.08057 kPa

Material	IG2
Peak friction angle	20.996 degrees
Peak cohesion	0 kPa
Residual Friction Angle	20.996 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 2.12
Maximum Total Displacement: 0.263275 m
Converged: no

Material	IG0
Peak friction angle	14.0797 degrees
Peak cohesion	0 kPa
Residual Friction Angle	14.0797 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	8.91774 degrees
Peak cohesion	3.06604 kPa
Residual Friction Angle	8.91774 degrees
Residual Cohesion	3.06604 kPa

Material	IG2
Peak friction angle	20.9055 degrees
Peak cohesion	0 kPa
Residual Friction Angle	20.9055 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 2.15
Maximum Total Displacement: 0.286267 m
Converged: no

Material	IG0
Peak friction angle	13.8909 degrees
Peak cohesion	0 kPa
Residual Friction Angle	13.8909 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	8.79527 degrees
Peak cohesion	3.02326 kPa
Residual Friction Angle	8.79527 degrees
Residual Cohesion	3.02326 kPa

Material	IG2
Peak friction angle	20.6386 degrees
Peak cohesion	0 kPa
Residual Friction Angle	20.6386 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 2.2
Maximum Total Displacement: 0.330765 m
Converged: no

Material	IG0
Peak friction angle	13.587 degrees
Peak cohesion	0 kPa
Residual Friction Angle	13.587 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	8.5984 degrees
Peak cohesion	2.95455 kPa
Residual Friction Angle	8.5984 degrees
Residual Cohesion	2.95455 kPa

Material	IG2
Peak friction angle	20.2078 degrees
Peak cohesion	0 kPa
Residual Friction Angle	20.2078 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 2.3
Maximum Total Displacement: 0.439283 m
Converged: no

Material	IG0
Peak friction angle	13.0169 degrees
Peak cohesion	0 kPa
Residual Friction Angle	13.0169 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	8.22979 degrees
Peak cohesion	2.82609 kPa
Residual Friction Angle	8.22979 degrees
Residual Cohesion	2.82609 kPa

Material	IG2
Peak friction angle	19.3961 degrees
Peak cohesion	0 kPa
Residual Friction Angle	19.3961 degrees
Residual Cohesion	0 kPa

Liner Properties

Liner: Zagatnica Larssen 607 n

Color	
Liner Type	Standard Beam
Formulation	Timoshenko
Area	0.02417 m2
Moment of Inertia	0.0007232 m4

Elastic Properties

Young's modulus	2.1e+008 kPa
Poisson's ratio	0.3

Properties changed in Osnovno

Area: 0.0161939 m2 (factor = 0.67)
Moment of Inertia: 0.000484544 m4 (factor = 0.67)

Displacements

Displacement data is not available for Osnovno until total displacement is viewed in a window
Displacement data is not available for Zagatnica until total displacement is viewed in a window
Displacement data is not available for Izkop1 until total displacement is viewed in a window
Displacement data is not available for Izkop2 until total displacement is viewed in a window
Displacement data is not available for Izkop3 until total displacement is viewed in a window

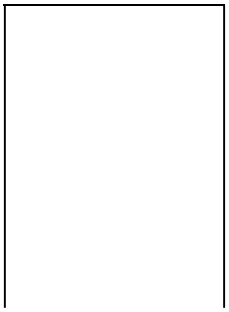
Yielded Elements

Yielded Mesh Elements

Number of yielded mesh elements on Osnovno: 7
Number of yielded mesh elements on Zagatnica: 7
Number of yielded mesh elements on Izkop1: 38
Number of yielded mesh elements on Izkop2: 177
Number of yielded mesh elements on Izkop3: 264

List of All Coordinates

External boundary



X	Y
2579.18	3811.98
2579.18	3810.16
2579.18	3808.38
2579.18	3807.98
2579.18	3801.98
2598.12	3801.98
2598.12	3807.98
2598.12	3811.98
2598.12	3813.38
2587.78	3813.38
2579.18	3813.38

Material boundary

X	Y
2579.18	3811.98
2587.78	3811.98
2598.12	3811.98

Material boundary

X	Y
2579.18	3807.98
2587.78	3807.98
2598.12	3807.98

Material boundary

X	Y
2587.78	3803.38
2587.78	3807.98
2587.78	3808.38
2587.78	3810.16
2587.78	3811.98
2587.78	3813.38

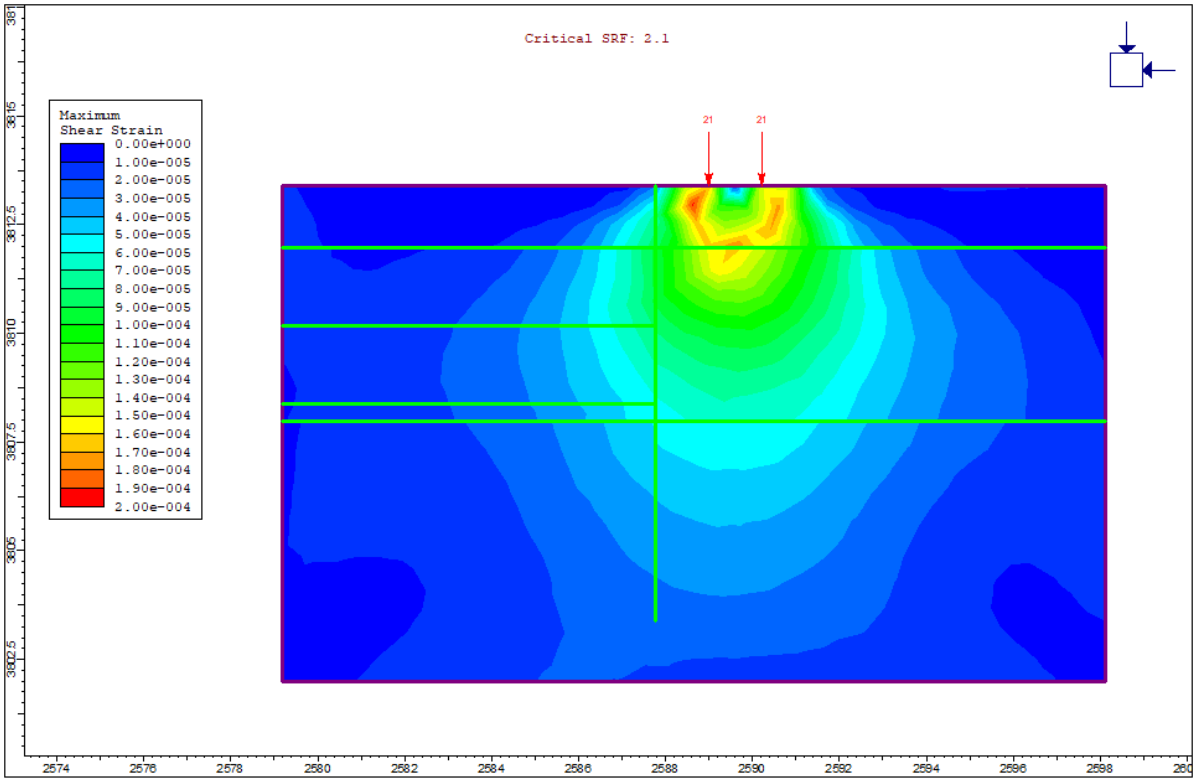
Material boundary

X	Y
2579.18	3808.38
2587.78	3808.38

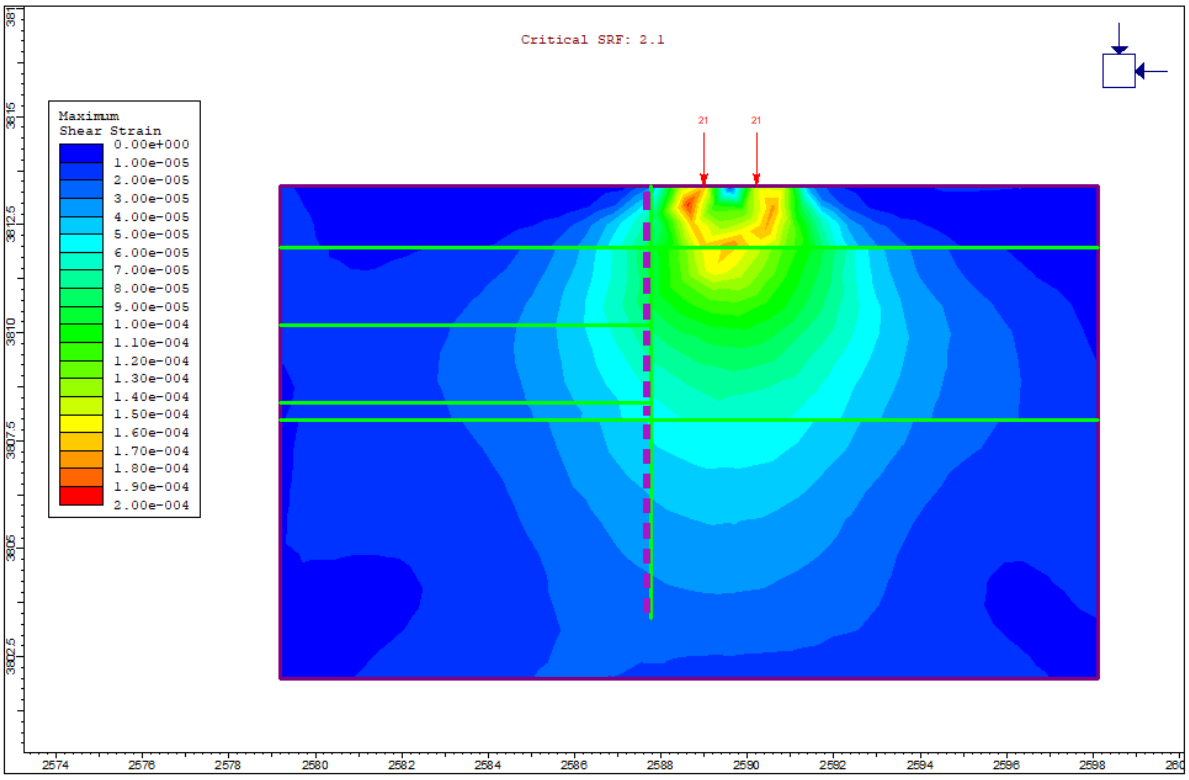
Material boundary

X	Y
2579.18	3810.16
2587.78	3810.16

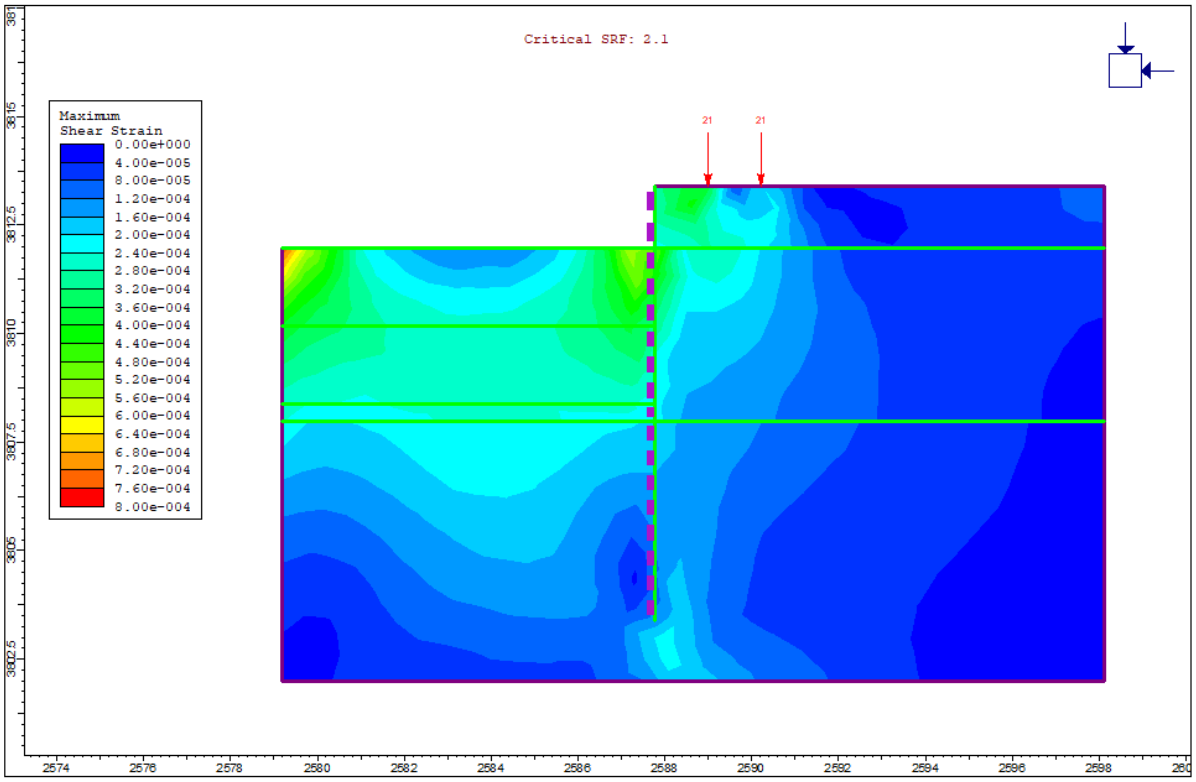
1.faza: Osnovno



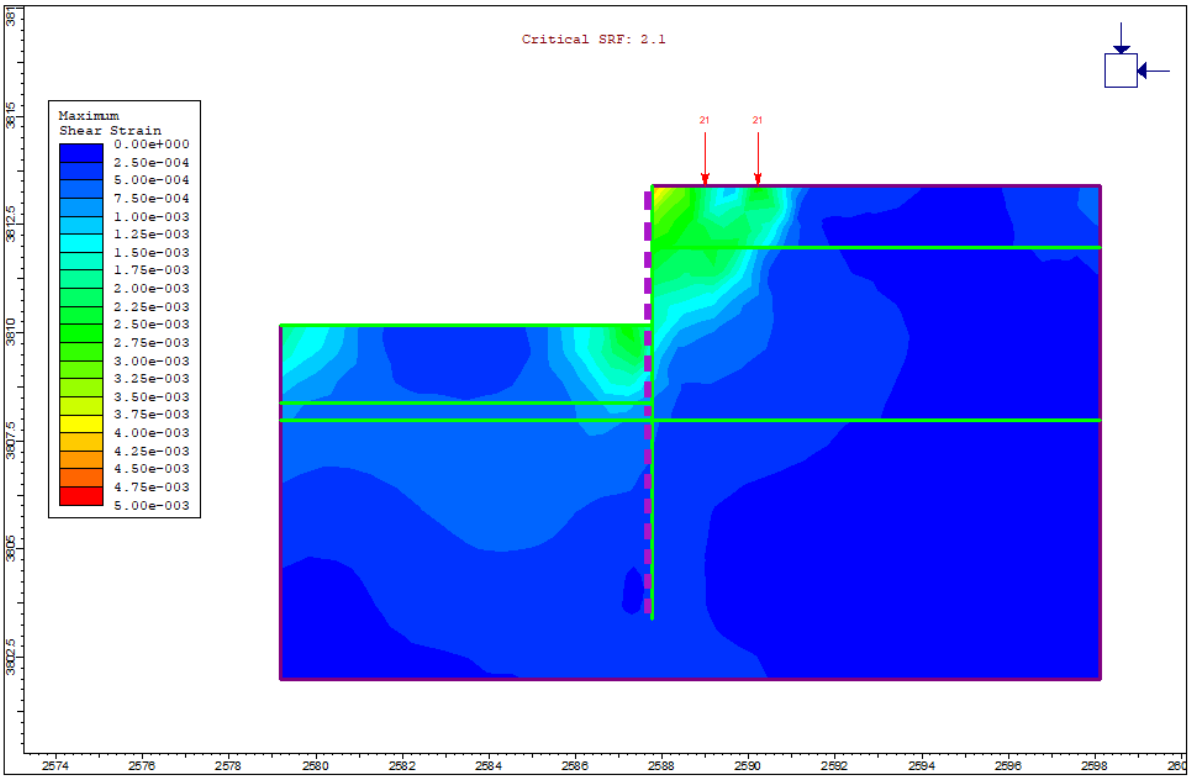
2.faza: Zagatnica



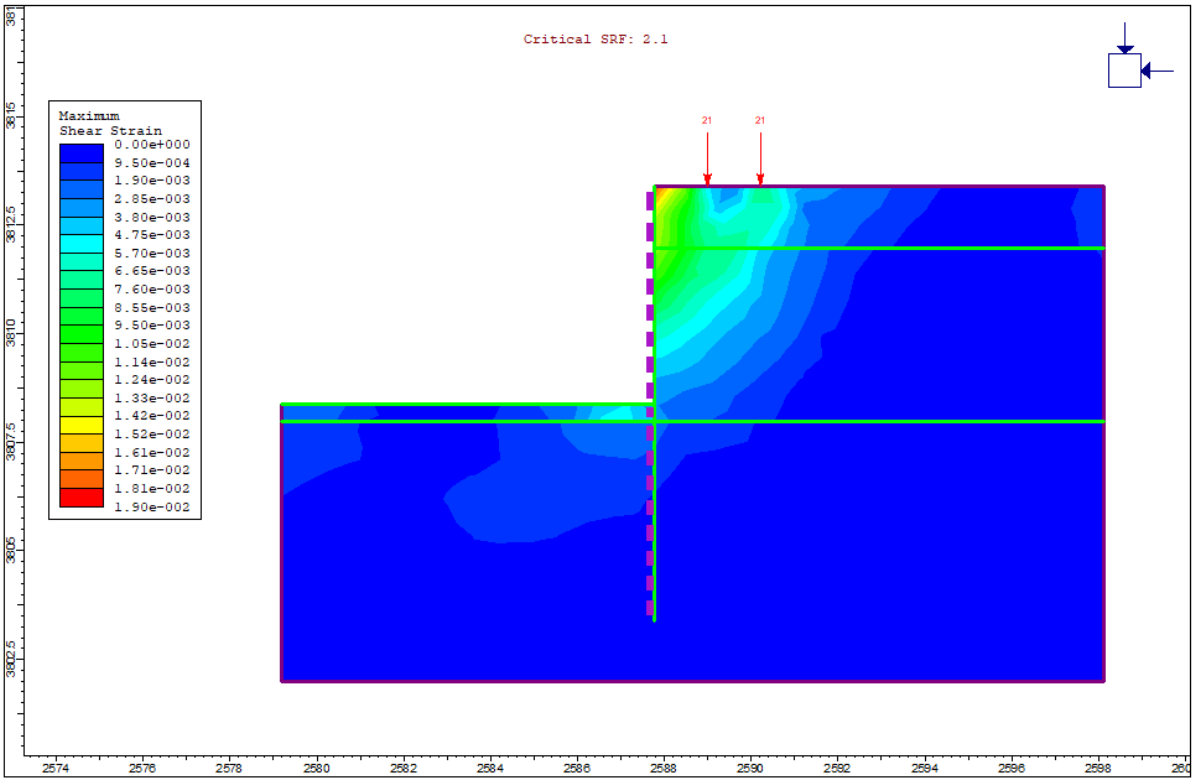
3.faza: Izkop1



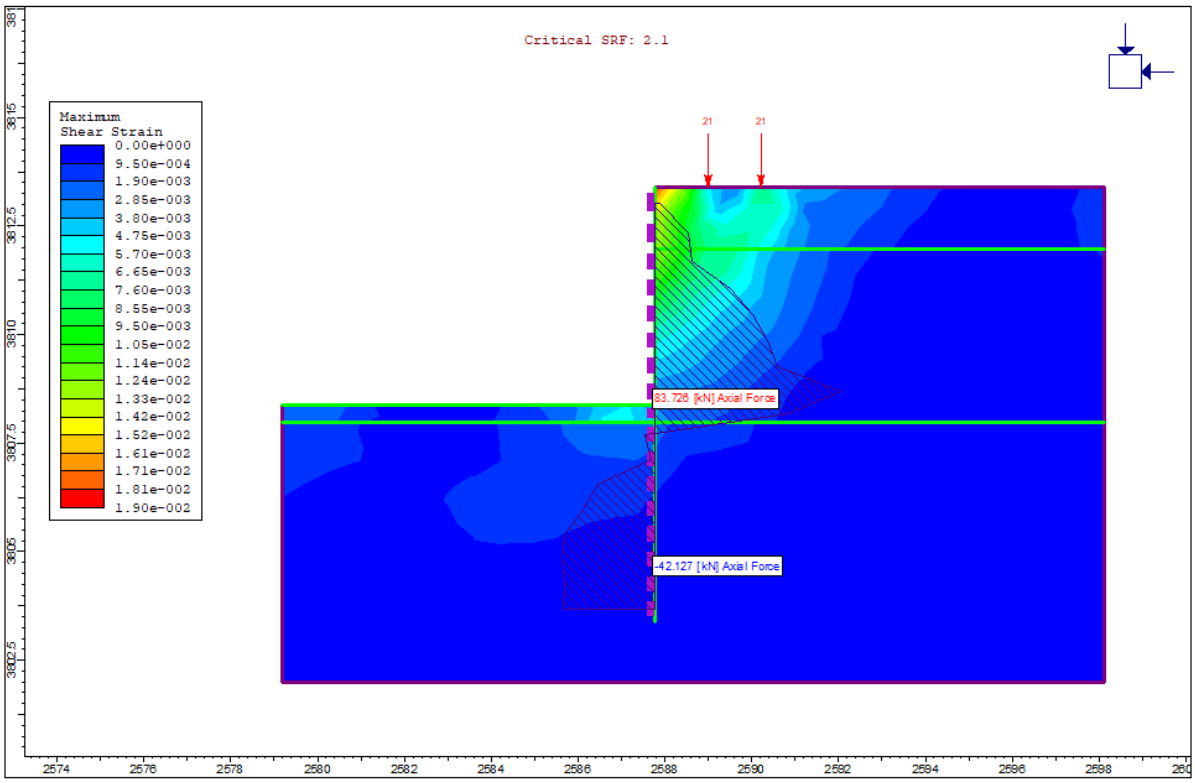
4.faza: Izkop2



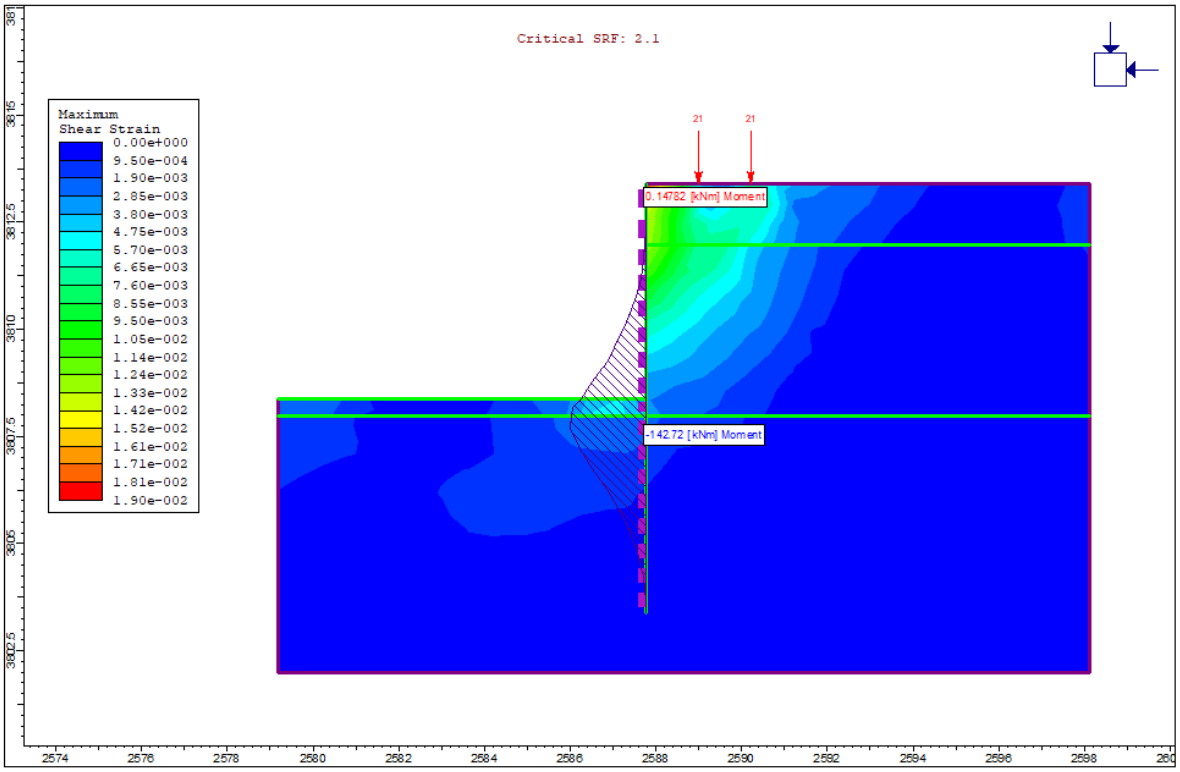
5.faza: Izkop3



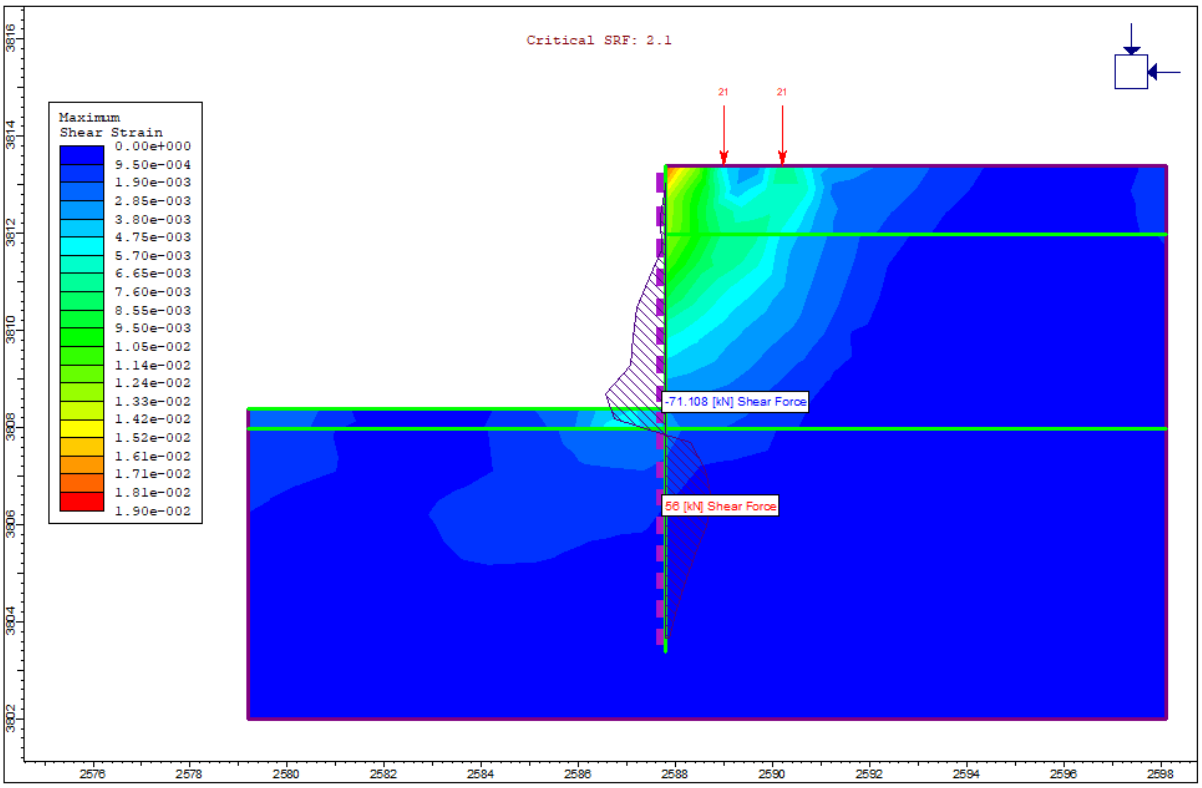
Osne sile v zagatnici



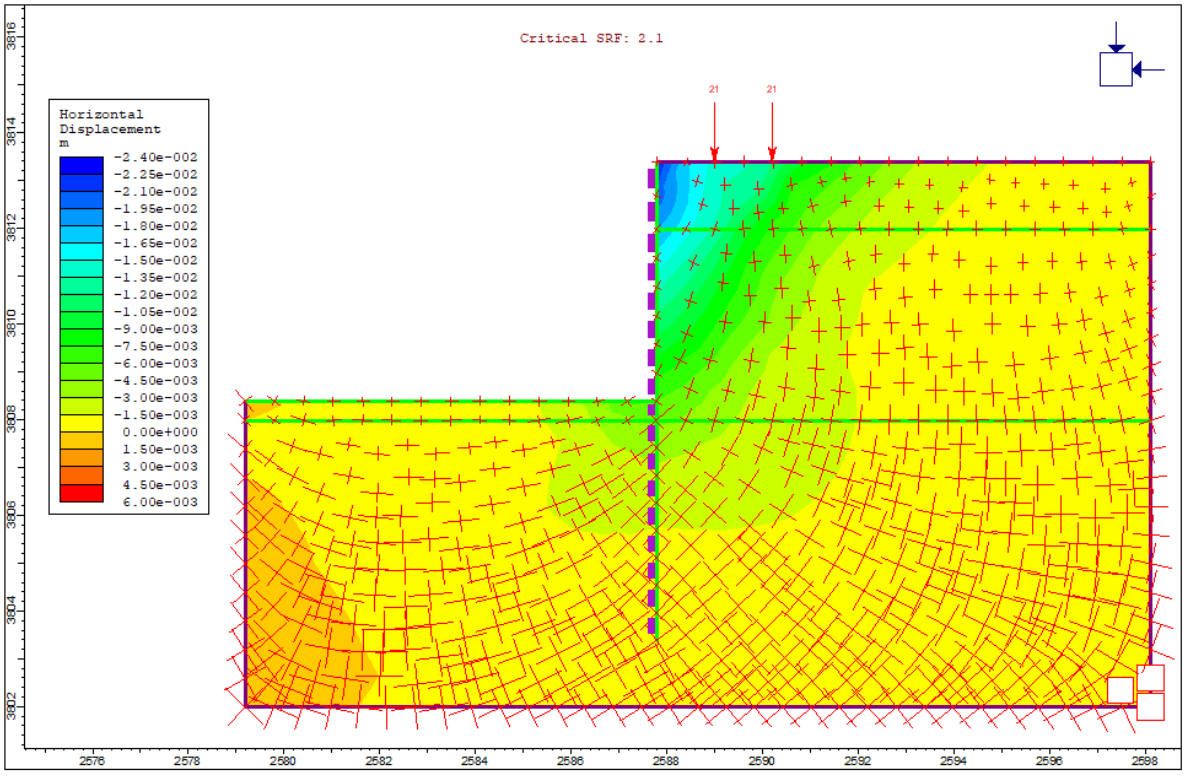
Upogibni momenti

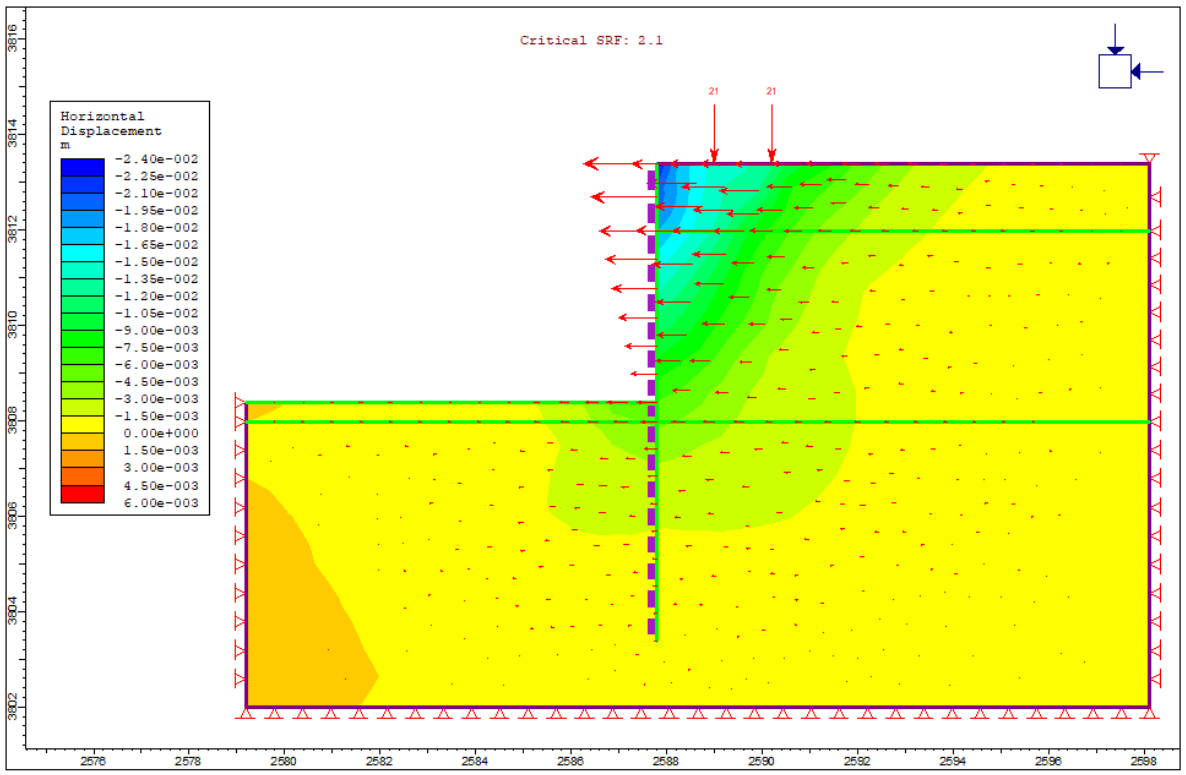


Prečne sile



Horizontalni premiki





SYSTEM

Stages

Nb	Title
1	Final state

Excavation support walls

Parameters			Top of wall		Inclination	
Wall type	δ_a	δ_p	x [m]	y [m]	α [°]	
Closed	0,67	-0,50	0	0	0	

δ_a : Active wall friction angle as fraction of soil friction angle for determining the active earth pressure coefficients
δ_p : Passive wall friction angle as fraction of soil friction angle for determining the earth resistance coefficients

Wall system cross section: sheet pile wall

Parameters			
Description	Value	Unit	
Profile	LARSSEN 605		
Sheet pile steel	S240GP		
Statical action	Double plank		
Bending stiffness EI	88977	[kNm^2/m]	

Ground surface

Level	Variation		Vertical surcharge			
y [m]		β [°]	Description	Action	p [kN/m^2]	As e. pr.
0	Inclin.	25,00			0	No

As e. pr. : Earth pressure due to surcharge treated as usual earth pressure (redistribution, min. earth pressure, load factor)

Soil layers

Description	Level	Parameters			Further attributes					
	y [m]	φ [°]	γ [kN/m^3]	c_a [kN/m^2]	c_p [kN/m^2]	k [m/s]	γ' [kN/m^3]	K_{ah} [-]	K_{0h} [-]	K_{ph} [-]
IG 0	0	28,00	20,00	0,00						
IG 1	-1,40	18,40	19,00	6,50						
IG 2	-6,40	39,00	21,00	0,00						

c_a : Cohesion of soil layer to determine earth pressure
c_p : Cohesion of soil layer to determine earth resistance
k : Permeability of soil layer
γ' : Quoyant unit weight of soil (without seepage force)

Props

Level	Inclination	dh	Support		Support movement on activation		Type	
y [m]	α [°]	[m]		f [kN/m^2]		dx [m]		
-2,00	-5,00	0	Rigid		Acc. to last stage		Anchor	

dh : Support height above which the section forces are smoothed
f : Spring constant

STAGE 1: Final state

Excavation support walls

Top of wall	Bottom of wall		
Support	t	Support	
Free	sought	Simply supported	

t : Depth of embedment relative to excavation base

Base of excavation

Level	Variation	Vertical surcharge			
y [m]		Description	Action	p [kN/m^2]	
-5,00	Horizontal			0	

Props

Prop No.	Level y [m]	Status	
1	-2,00	active	

Earth resistance / earth pressure

Earth resistance	Earth pressure			
	Load factor	Redistribute	Action	
Calculate	(1) EXL	None	Earth pressure permanent	

(1) : Down to excavation level

Final state, !Serviceability LS occasional, AC 1: Results

Deformations

y [m]	Dx [mm]	Rz [‰]	
0	5,50	-2,73	
-0,50	4,13	-2,72	
-1,00	2,77	-2,73	
-1,40	1,67	-2,75	
-1,40	1,67	-2,75	
-1,90	0,28	-2,82	
-2,00	-0,00	-2,84	
-2,00	-0,00	-2,84	
-2,50	-1,37	-2,61	
-3,00	-2,58	-2,20	
-3,50	-3,55	-1,61	
-4,00	-4,17	-0,84	
-4,50	-4,35	0,12	
-5,00	-4,01	1,26	
-5,00	-4,01	1,26	
-5,50	-3,16	2,11	
-6,00	-1,95	2,70	
-6,40	-0,80	2,98	
-6,40	-0,80	2,98	
-6,67	-0,00	3,04	
-6,67	-0,00	3,04	
-6,91	0,73	3,04	

Dx : Displacements
Rz : Rotations

Wall pressures

y [m]	De [kN/m²]	Du [kN/m²]	Do [kN/m²]	Dw [kN/m²]	Ew [kN/m²]	Dr [kN/m²]	
0	0	0	0	0	0	0	
-1,40	21,13	21,13	0	0	0	21,13	
-1,40	27,26	27,26	0	0	0	27,26	
-2,00	38,36	38,36	0	0	0	38,36	
-5,00	93,85	93,85	0	0	0	93,85	
-5,00	93,85	93,85	0	0	-20,05	73,80	
-6,40	119,75	119,75	0	0	-83,35	36,40	
-6,40	64,86	64,86	0	0	-266,50	-201,64	
-6,67	67,82	67,82	0	0	-322,63	-254,81	
-6,91	70,46	70,46	0	0	-372,86	-302,40	

De : Active or increased active earth pressure including berm (charact. values)
Du : Redistributed earth pressure
Do : Non-redistributed earth pressure
Dw : Water pressure
Ew : Earth resistance
Dr : Resultant of wall pressure

Wall friction angles and inclinations

δ_a	δ_p	α [°]	β_a [°]	β_p [°]	
0,667	-0,500	0	25,00	0	

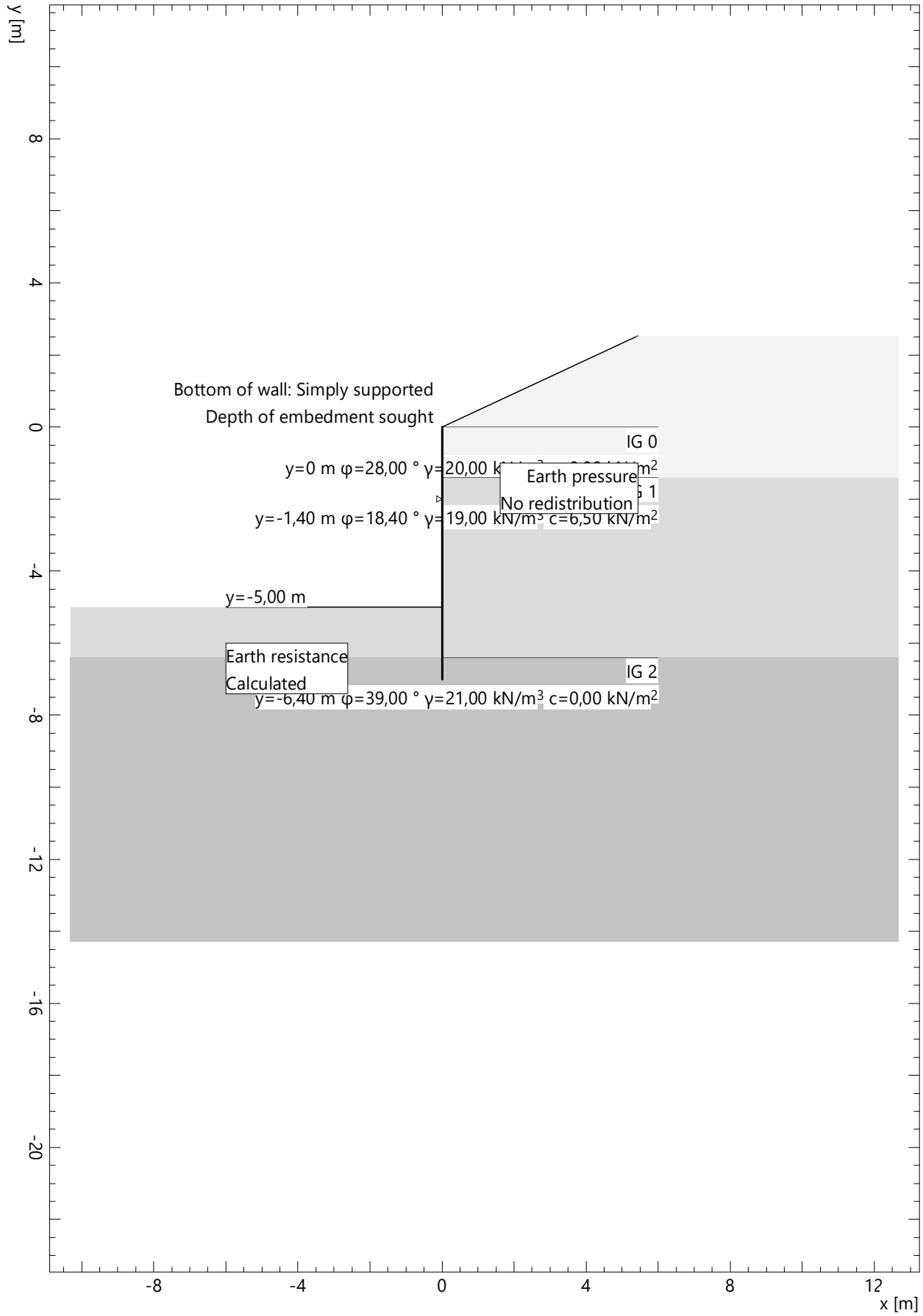
δ_a : Active wall friction angle as fraction of φ
δ_p : Passive wall friction angle as fraction of φ
α : Inclination of wall
β_a : Inclination of ground surface
β_p : Inclination of excavation base

Earth pressure coefficients of soil layers

y [m]	γ [kN/m^3]	φ [°]	c_a [kN/m^2]	c_p [kN/m^2]	K_{ah} [-]	K_{0h} [-]	K_{eh} [-]	K_{ph} [-]	
0	20,00	28,00	0	0	0,5320	0,7547	0,7547	4,1967	
-1,40	19,00	18,40	6,50	6,50	0,9004	0,9736	0,9736	2,3797	
-6,40	21,00	39,00	0	0	0,2618	0,5273	0,5273	10,0188	

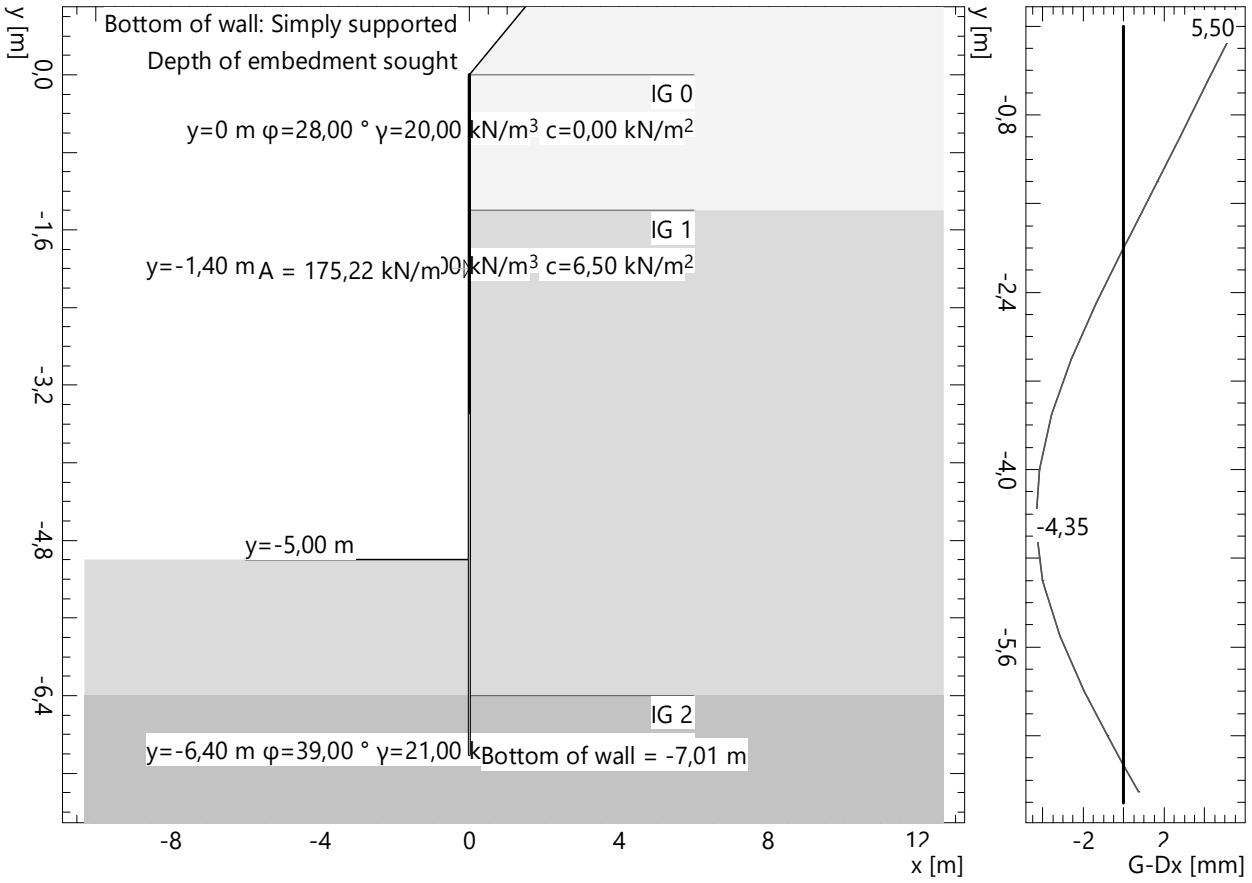
K_{eh} : Increased active earth pressure coefficient (r = 1,00)

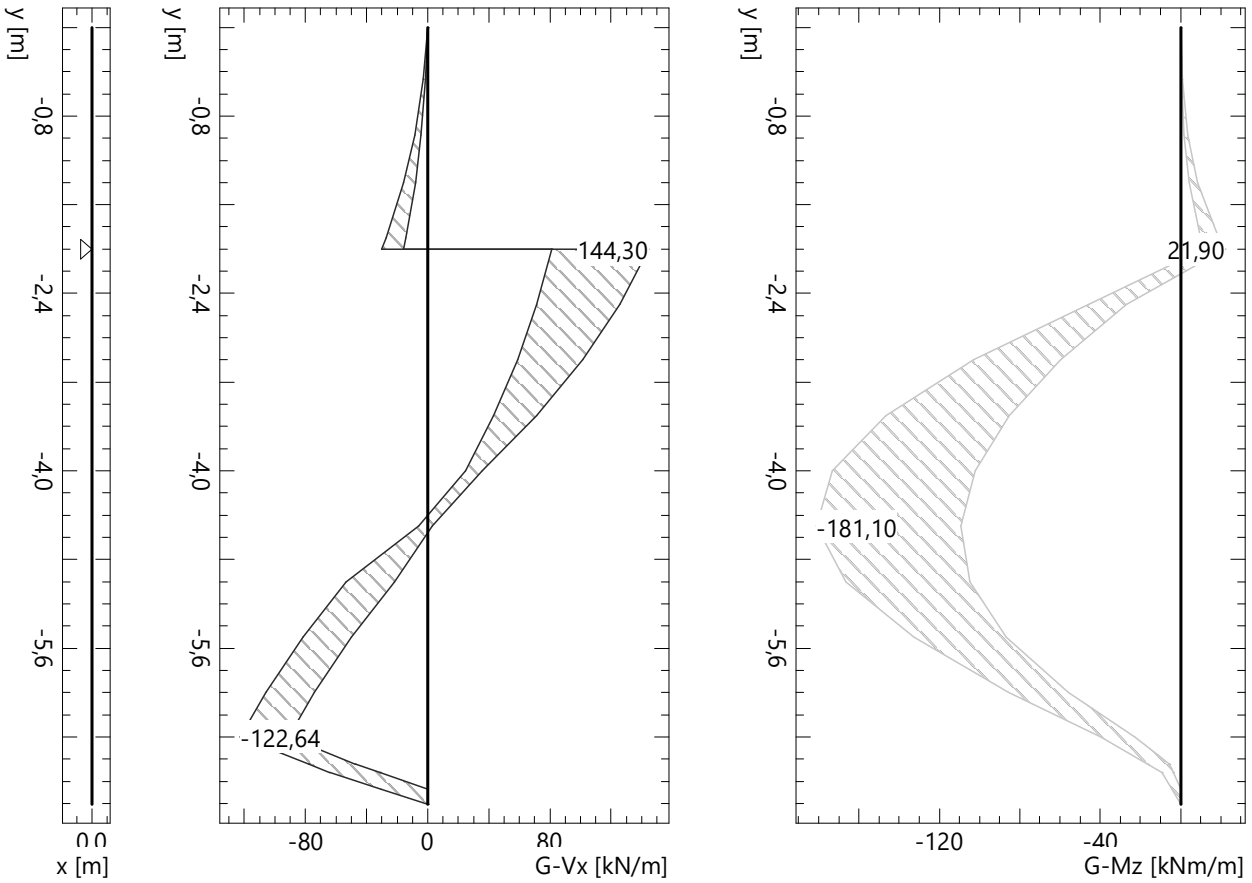
Final state, !Serviceability LS occasional, AC 1: Deformation graphic



Nr.:

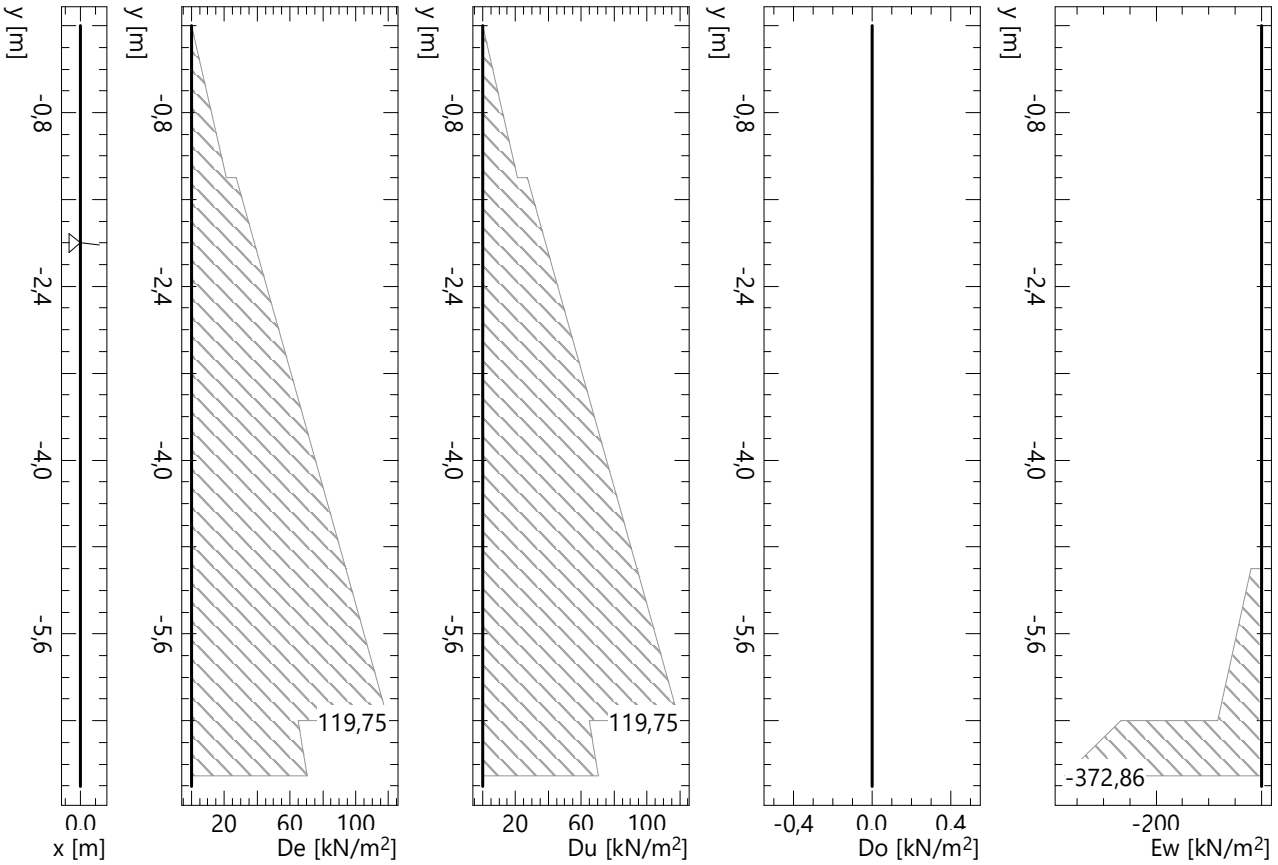
Final state, !Serviceability LS occasional, AC 1: Deformation graphic

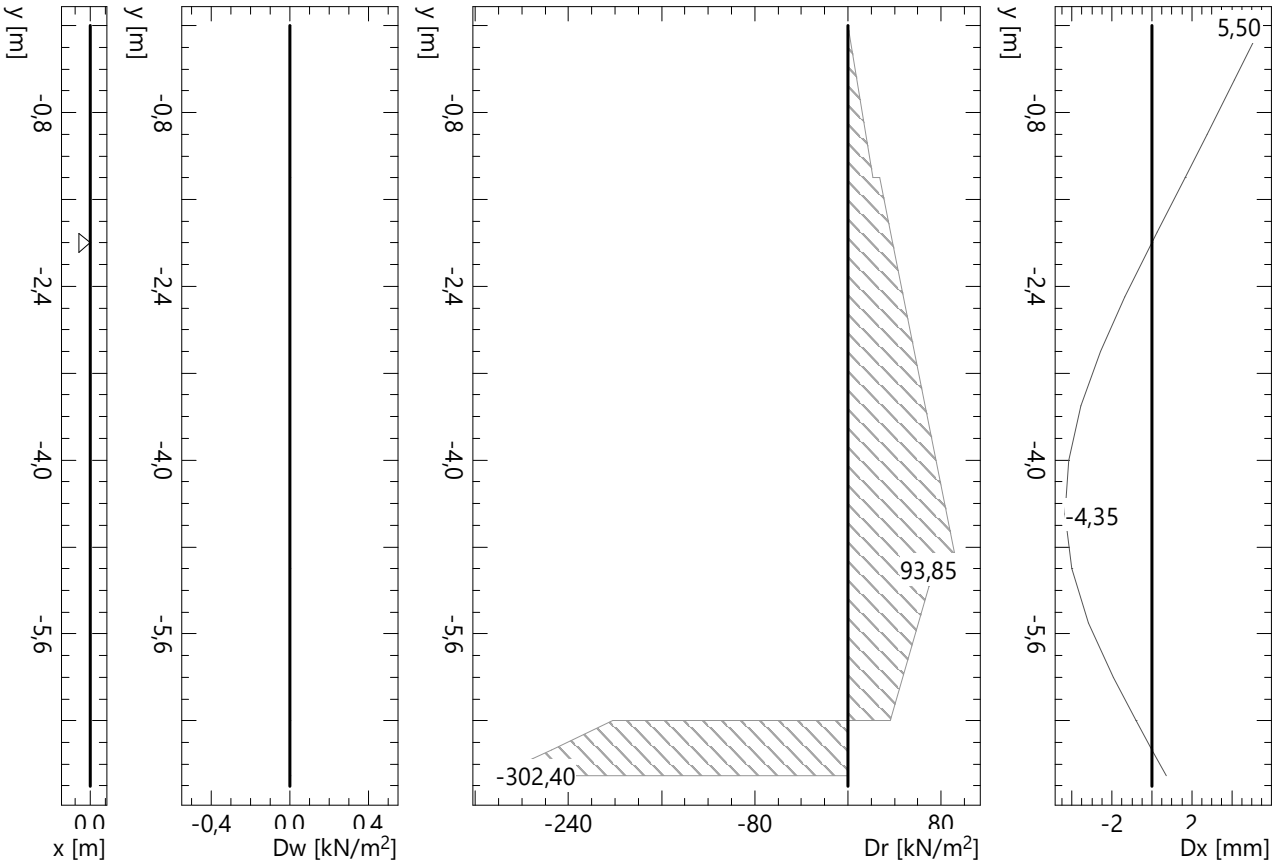




Nr.:

Final state, !Serviceability LS occasional, AC 1: Deformation graphic





Nr.:

GEOTECHNICAL MODEL

Soil layer attributes

Id	Description	φ_k [°]	γ_k [kN/m^3]	c_k [kN/m^2]	
M1	IG 0	28,00	20,00	0,00	
M2	IG 1	18,40	19,00	6,50	
M3	IG 2	39,00	21,00	0,00	

Prestressed anchor

Parameters				Geometry					
Anchor No.	P_{pk} [kN/m]	γ_0	γ_A	x [m]	y [m]	α [°]	l_{min} [m]	l_{max} [m]	
1	350,00	0,600	1,000	0	-2,00	-5,00	12,00	10,00	

P_{pk} : Ultimate tendon force
γ_0 : Factor to calculate the lock-off force $P_0 = P_{pk} * \gamma_0$
γ_A : Anchor force factor
l_{min} : Min. free anchor length
l_{max} : Max. free anchor length

Shear resistances

Parameters			Geometry				
W_1 [kN/m]	W_2 [kN/m]	L_E [m]	x_1 [m]	y_1 [m]	x_2 [m]	y_2 [m]	
1,00	1,00	0	0,00	0	0,00	-7,01	

L_E : Length of transmission zone

Limit state values: Definition with centres and constraint line

Slip circles with minimum safeties

LSS	AC	Circle No.	x [m]	y [m]	R [m]	Anchor	F_{ex} [-]	L_{req} [m]	L_{min} [m]	Remark see footnotes	
1	1	59	-0,39	1,95	8,97	w/o inc	1,22				
		79	-0,39	2,72	9,75	w/o inc	1,22				
		58	-0,78	1,95	9,00	w/o inc	1,22				
		78	-0,78	2,72	9,77	w/o inc	1,22				

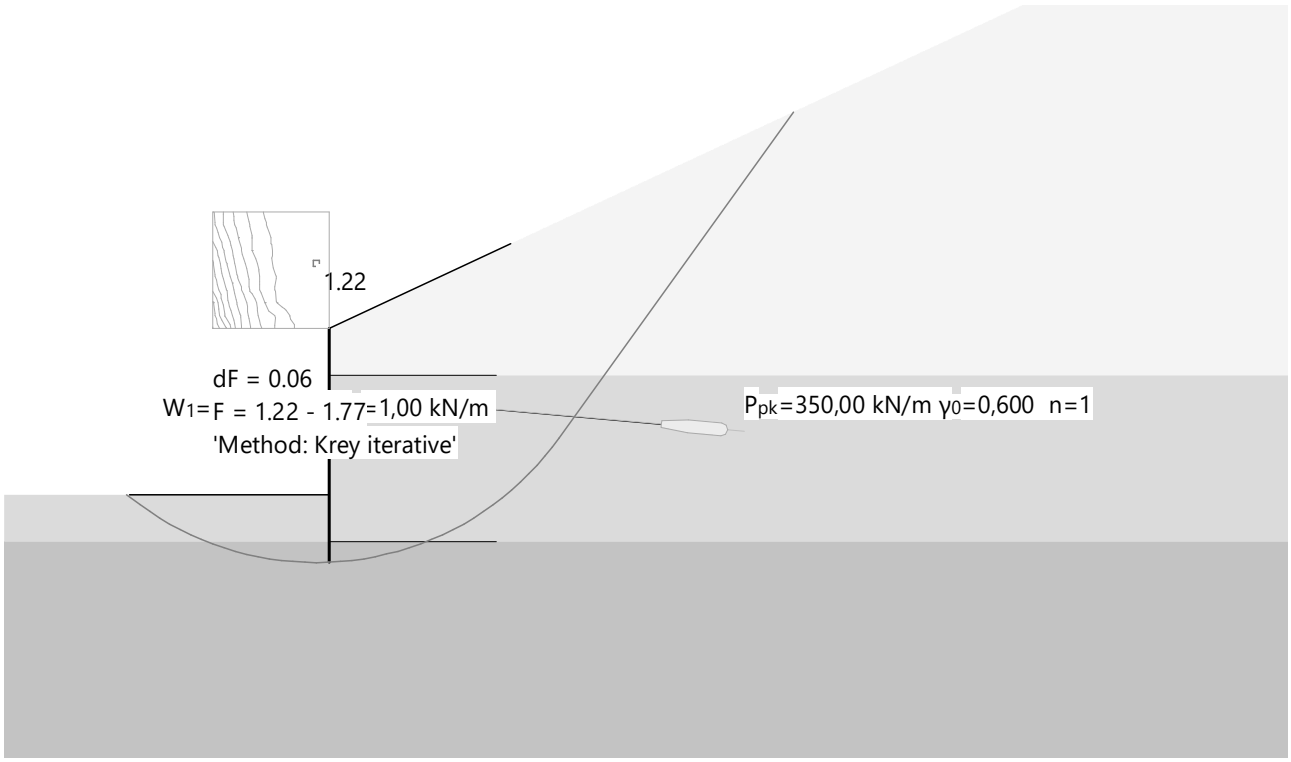
LSS : Limit state specification
AC : Action combinations
F_{ex} : existing safety, required safety $F_{req} = 1.00$
L_{req} : calculated required free anchor length between L_{min} - L_{max}
L_{min} : input minimum free anchor length

Anchor

Anchor No.	LSS	AC	R_{d1} [kN]	R_{d2} [kN]	R_d [kN]	Circle No.	L_{min} [m]	L_{max} [m]	L_{req} [m]	
1	1	1	259,26	210,00	210,00		10,00	10,00	10,00	

LSS : Limit state specification
AC : Action combinations
R_{d1} : Dimensioning value of ultimate resistance of ultimate force $R_{d1}=P_{pk}/\gamma_M$
R_{d2} : Dimensioning value of ultimate resistance of lock-off (initial) force $R_{d2}=P_0*\gamma_A$
R_d : In der Standsicherheitsberechnung verwendeter Bemessungswert des Tragwiderstandes (Minimum aus R_{d1} and R_{d2})
L_{min} : input minimum free anchor length
L_{max} : input maximum free anchor length
L_{req} : calculated required free anchor length between L_{min} - L_{max}

Limit state values: Critical slip surface, Definition with centres and constraint line Scale 1 :226,9



Phase2 Analysis Information

Project Summary

File Name: Gradbena jama Brdo_sidra
Last saved with Phase2 version: 8.005
Analysis: Converted from Slide v7.009 with PHASE2 8.005

General Settings

Number of Stages: 4
Analysis Type: Plane Strain
Solver Type: Gaussian Elimination
Units: Metric, stress as kPa

Analysis Options

Maximum Number of Iterations: 500
Tolerance: 0.001
Number of Load Steps: Automatic
Convergence Type: Absolute Energy
Tensile Failure: Reduces Shear Strength
Joint tension reduces joint stiffness by a factor of 0.01

Strength Reduction Settings

Inital Estimate of SRF: 1
Step Size: Automatic
Tolerance (SRF): 0.01
Limit SSR Search Area: No
Apply SSR to Mohr-Coulomb Tensile Strength: Yes
Convergence Parameters: Automatic

Groundwater Analysis

Method: Piezometric Lines
Pore Fluid Unit Weight: 9.81 kN/m3
Probability: None

Field Stress

Field stress: gravity
Using actual ground surface
Total stress ratio (horizontal/vertical in-plane): 1
Total stress ratio (horizontal/vertical out-of-plane): 1
Locked-in horizontal stress (in-plane): 0
Locked-in horizontal stress (out-of-plane): 0

Mesh

Mesh type: graded
Element type: 3 noded triangles

Number of elements on Osnovno: 218
Number of nodes on Osnovno: 131
Number of elements on Zagatnica: 218
Number of nodes on Zagatnica: 131
Number of elements on Izkop1: 210
Number of nodes on Izkop1: 127
Number of elements on Izkop2+ IBO: 194
Number of nodes on Izkop2+ IBO: 119

Mesh Quality

All elements are of good quality

Poor quality elements defined as:

Side length ratio (maximum / minimum) > 30.00
Minimum interior angle < 2.0 degrees
Maximum interior angle > 175.0 degrees

Excavation Areas

Original Un-deformed Areas

External Boundary Area: 405.425 m2
External Boundary Perimeter: 89.510 m

Osnovno

Values not available until this stage is viewed in a window

Zagatnica

Values not available until this stage is viewed in a window

Izkop1

Values not available until this stage is viewed in a window

Izkop2+ IBO

Values not available until this stage is viewed in a window

Material Properties

Material: IG0

Color	
Initial element loading	field stress & body force
Unit weight	20 kN/m3
Elastic type	isotropic
Young's modulus	50000 kPa
Poisson's ratio	0.4
Failure criterion	Mohr-Coulomb
Peak tensile strength	0 kPa
Residual tensile strength	0 kPa
Peak friction angle	28 degrees
Peak cohesion	0 kPa
Material type	Plastic
Dilation Angle	0 degrees
Residual Friction Angle	28 degrees
Residual Cohesion	0 kPa
Piezo to use	None
Ru value	0

Material: IG1

Color	
Initial element loading	field stress & body force
Unit weight	19 kN/m3
Elastic type	isotropic
Young's modulus	50000 kPa
Poisson's ratio	0.4
Failure criterion	Mohr-Coulomb
Peak tensile strength	6.5 kPa
Residual tensile strength	0 kPa
Peak friction angle	18.4 degrees
Peak cohesion	6.5 kPa
Material type	Plastic
Dilation Angle	0 degrees
Residual Friction Angle	18.4 degrees
Residual Cohesion	6.5 kPa
Piezo to use	None
Ru value	0

Material: IG2

Color	
Initial element loading	field stress & body force
Unit weight	21 kN/m3
Elastic type	isotropic
Young's modulus	50000 kPa
Poisson's ratio	0.4
Failure criterion	Mohr-Coulomb
Peak tensile strength	0 kPa
Residual tensile strength	0 kPa
Peak friction angle	39 degrees
Peak cohesion	0 kPa
Material type	Plastic
Dilation Angle	0 degrees
Residual Friction Angle	39 degrees
Residual Cohesion	0 kPa
Piezo to use	None
Ru value	0

Shear Strength Reduction - Material Properties

Strength Reduction Factor: 1
Maximum Total Displacement: 0.0177112 m
Converged: yes

Material	IG0
Peak friction angle	28 degrees
Peak cohesion	0 kPa
Residual Friction Angle	28 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	18.4 degrees
Peak cohesion	6.5 kPa
Residual Friction Angle	18.4 degrees
Residual Cohesion	6.5 kPa

Material	IG2
Peak friction angle	39 degrees
Peak cohesion	0 kPa
Residual Friction Angle	39 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.4
Maximum Total Displacement: 0.0582582 m
Converged: yes

Material	IG0
Peak friction angle	20.7964 degrees
Peak cohesion	0 kPa
Residual Friction Angle	20.7964 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	13.3663 degrees
Peak cohesion	4.64286 kPa
Residual Friction Angle	13.3663 degrees
Residual Cohesion	4.64286 kPa

Material	IG2
Peak friction angle	30.0458 degrees
Peak cohesion	0 kPa
Residual Friction Angle	30.0458 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.7
Maximum Total Displacement: 0.15467 m
Converged: yes

Material	IG0
Peak friction angle	17.3681 degrees
Peak cohesion	0 kPa
Residual Friction Angle	17.3681 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	11.0717 degrees
Peak cohesion	3.82353 kPa
Residual Friction Angle	11.0717 degrees
Residual Cohesion	3.82353 kPa

Material	IG2
Peak friction angle	25.4705 degrees
Peak cohesion	0 kPa
Residual Friction Angle	25.4705 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.9
Maximum Total Displacement: 0.48824 m
Converged: yes

Material	IG0
Peak friction angle	15.6341 degrees
Peak cohesion	0 kPa
Residual Friction Angle	15.6341 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.9308 degrees
Peak cohesion	3.42105 kPa
Residual Friction Angle	9.9308 degrees
Residual Cohesion	3.42105 kPa

Material	IG2
Peak friction angle	23.0838 degrees
Peak cohesion	0 kPa
Residual Friction Angle	23.0838 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.95
Maximum Total Displacement: 0.615205 m
Converged: yes

Material	IG0
Peak friction angle	15.2521 degrees
Peak cohesion	0 kPa
Residual Friction Angle	15.2521 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.68105 degrees
Peak cohesion	3.33333 kPa
Residual Friction Angle	9.68105 degrees
Residual Cohesion	3.33333 kPa

Material	IG2
Peak friction angle	22.5518 degrees
Peak cohesion	0 kPa
Residual Friction Angle	22.5518 degrees
Residual Cohesion	0 kPa

Critical Strength Reduction Factor: 1.97
Maximum Total Displacement: 0.682042 m
Converged: yes

Material	IG0
Peak friction angle	15.1044 degrees
Peak cohesion	0 kPa
Residual Friction Angle	15.1044 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.58459 degrees
Peak cohesion	3.29949 kPa
Residual Friction Angle	9.58459 degrees
Residual Cohesion	3.29949 kPa

Material	IG2
Peak friction angle	22.3455 degrees
Peak cohesion	0 kPa
Residual Friction Angle	22.3455 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 1.98
Maximum Total Displacement: 0.489028 m
Converged: no

Material	IG0
Peak friction angle	15.0316 degrees
Peak cohesion	0 kPa
Residual Friction Angle	15.0316 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.53708 degrees
Peak cohesion	3.28283 kPa
Residual Friction Angle	9.53708 degrees
Residual Cohesion	3.28283 kPa

Material	IG2
Peak friction angle	22.2437 degrees
Peak cohesion	0 kPa
Residual Friction Angle	22.2437 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 2
Maximum Total Displacement: 0.515843 m
Converged: no

Material	IG0
Peak friction angle	14.888 degrees
Peak cohesion	0 kPa
Residual Friction Angle	14.888 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.44343 degrees
Peak cohesion	3.25 kPa
Residual Friction Angle	9.44343 degrees
Residual Cohesion	3.25 kPa

Material	IG2
Peak friction angle	22.0426 degrees
Peak cohesion	0 kPa
Residual Friction Angle	22.0426 degrees
Residual Cohesion	0 kPa

Strength Reduction Factor: 2.1
Maximum Total Displacement: 0.588011 m
Converged: no

Material	IG0
Peak friction angle	14.2084 degrees
Peak cohesion	0 kPa
Residual Friction Angle	14.2084 degrees
Residual Cohesion	0 kPa

Material	IG1
Peak friction angle	9.00129 degrees
Peak cohesion	3.09524 kPa
Residual Friction Angle	9.00129 degrees
Residual Cohesion	3.09524 kPa

Material	IG2
Peak friction angle	21.0872 degrees
Peak cohesion	0 kPa
Residual Friction Angle	21.0872 degrees
Residual Cohesion	0 kPa

Liner Properties

Liner: Zagatnica Larssen 605

Color	
Liner Type	Standard Beam
Formulation	Timoshenko
Area	0.01567 m2
Moment of Inertia	0.0004242 m4

Elastic Properties

Young's modulus	2.1e+008 kPa
Poisson's ratio	0.3

Properties changed in Osnovno

Area: 0.0104989 m2 (factor = 0.67)
Moment of Inertia: 0.000284214 m4 (factor = 0.67)

Bolt Properties

Bolt name	IBO
Color	
Bolt Type	End anchored bolt
Diameter	28 mm
Young's modulus	1.6e+008 kPa
Tensile capacity	350 kN
Residual Tensile capacity	350 kN
Pre-tensioning	0 kN
Pre-tensioning force	Constant in install stage
Out-of-plane spacing	2.5 m

Displacements

Displacement data is not available for Osnovno until total displacement is viewed in a window
Displacement data is not available for Zagatnica until total displacement is viewed in a window
Displacement data is not available for Izkop1 until total displacement is viewed in a window
Displacement data is not available for Izkop2+ IBO until total displacement is viewed in a window

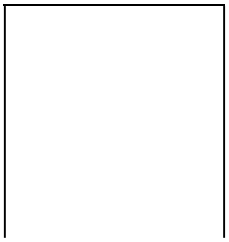
Yielded Elements

Yielded Mesh Elements

Number of yielded mesh elements is not available for Osnovno until the stage is viewed in a window
Number of yielded mesh elements is not available for Zagatnica until the stage is viewed in a window
Number of yielded mesh elements is not available for Izkop1 until the stage is viewed in a window
Number of yielded mesh elements is not available for Izkop2+ IBO until the stage is viewed in a window

List of All Coordinates

External boundary



X	Y
2607.53	3813.38
2607.53	3821.71
2587.78	3813.38
2579.18	3808.38
2579.18	3807.98
2579.18	3801.98
2607.53	3801.98
2607.53	3807.98
2607.53	3811.98

Material boundary

X	Y
2587.78	3811.98
2607.53	3811.98

Material boundary

X	Y
2579.18	3807.98
2587.78	3807.98
2607.53	3807.98

Material boundary

X	Y
2587.78	3805.38
2587.78	3807.98
2587.78	3808.38
2587.78	3811.38
2587.78	3811.98
2587.78	3813.38

Material boundary

X	Y
2579.18	3808.38
2587.78	3808.38

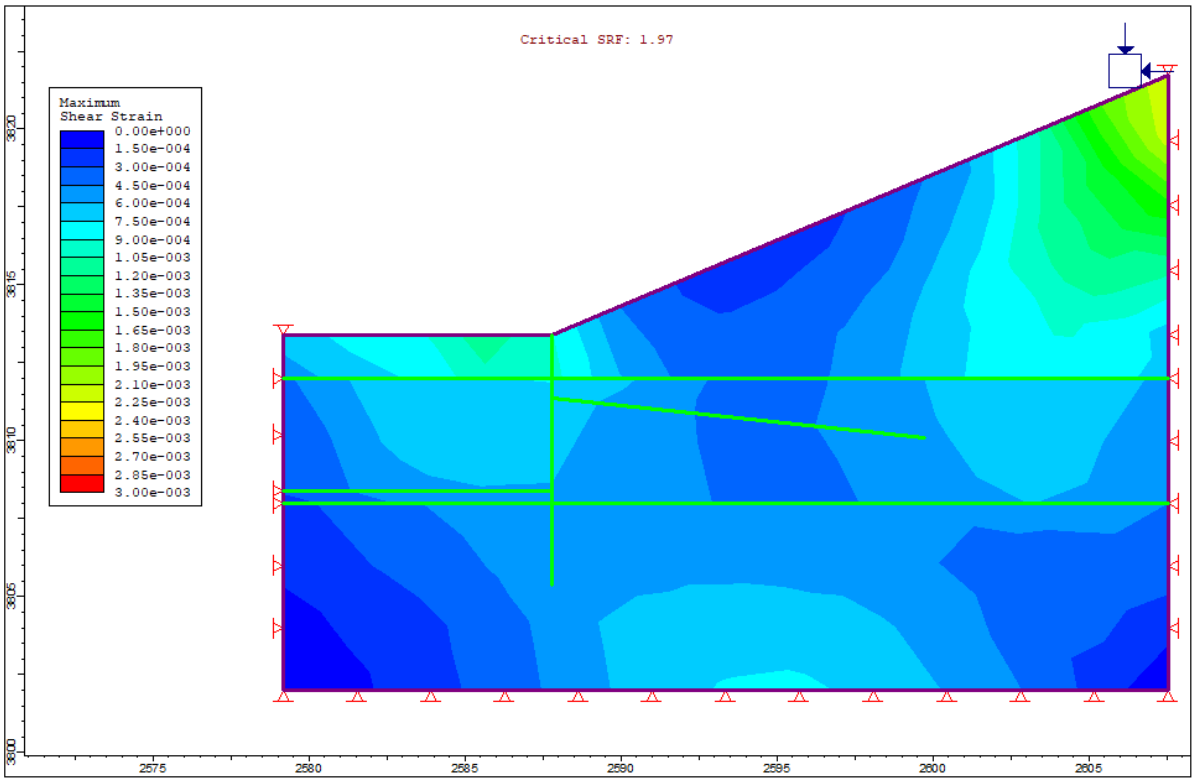
Material boundary

X	Y
2587.78	3811.38
2599.71	3810.12

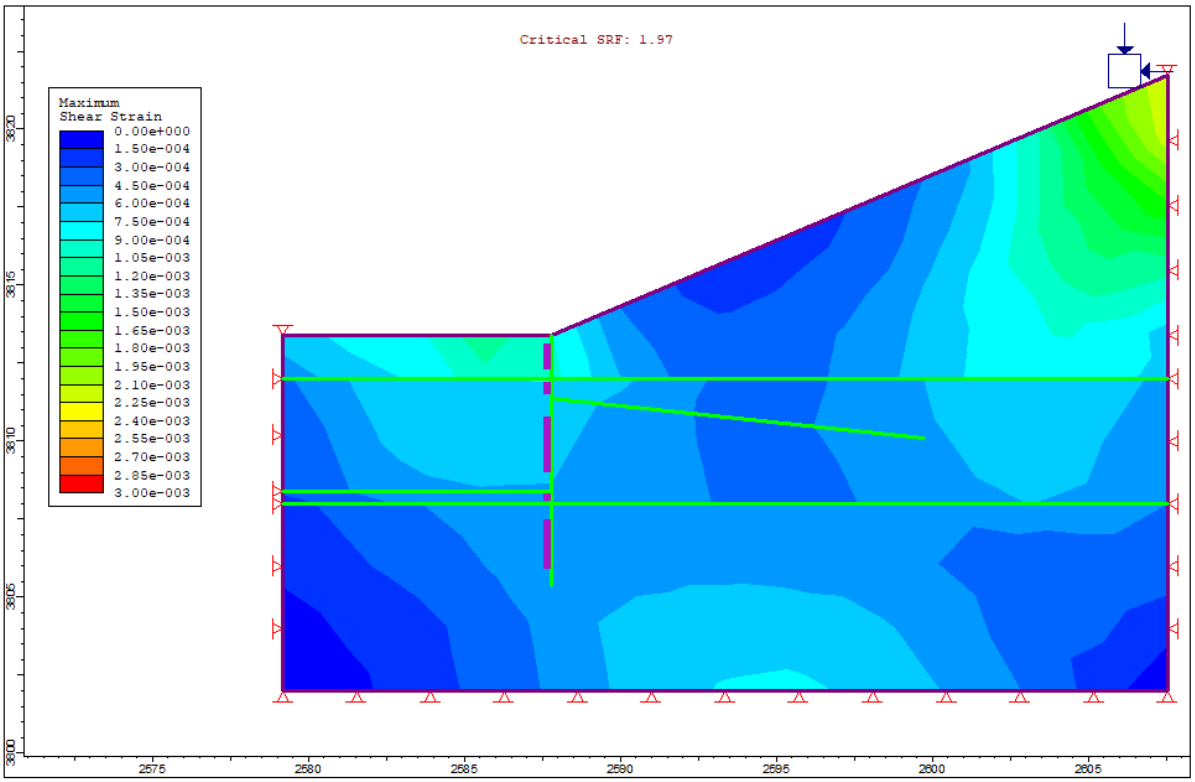
Bolt

X	Y
2587.78	3811.38
2599.71	3810.12

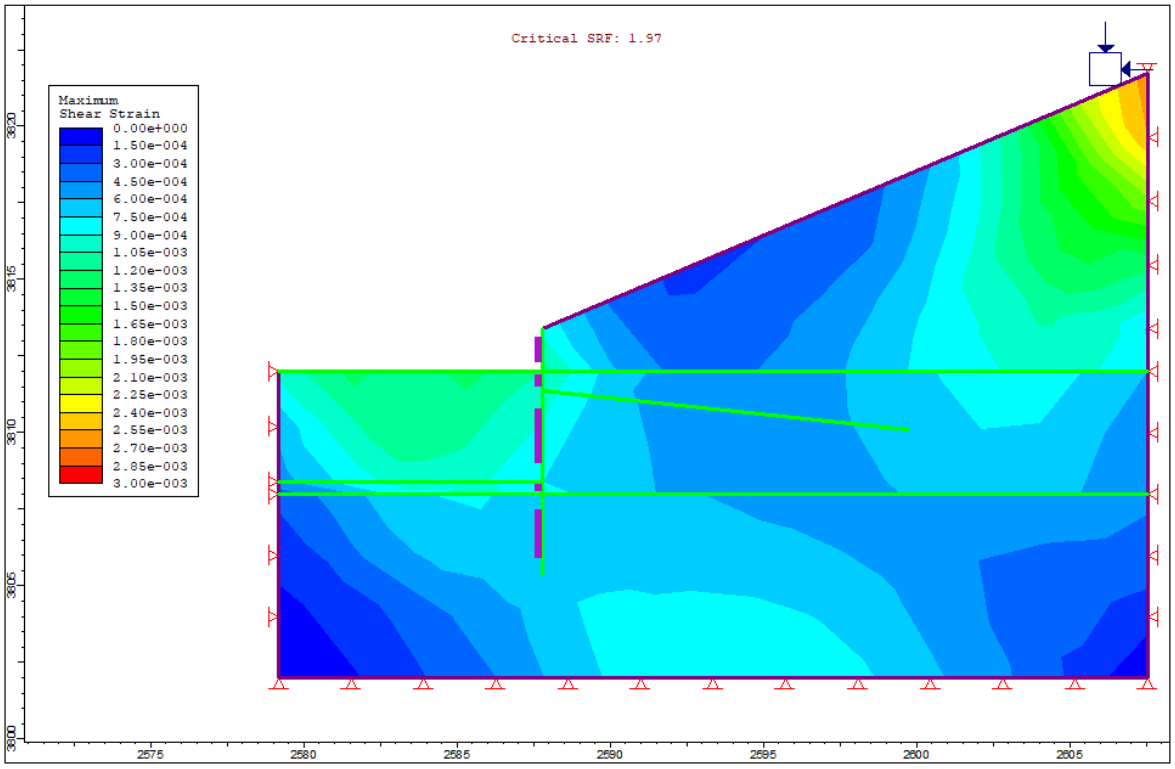
1. Faza: Osnova



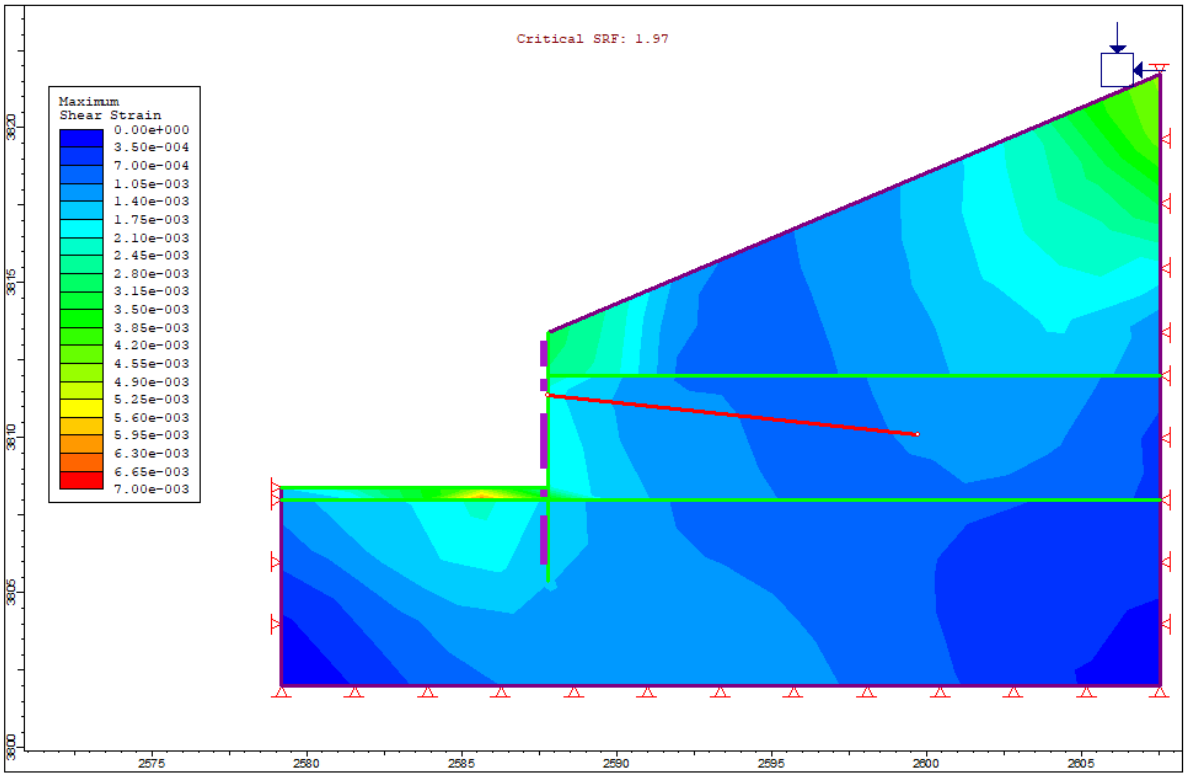
2. Faza: Zagatnica



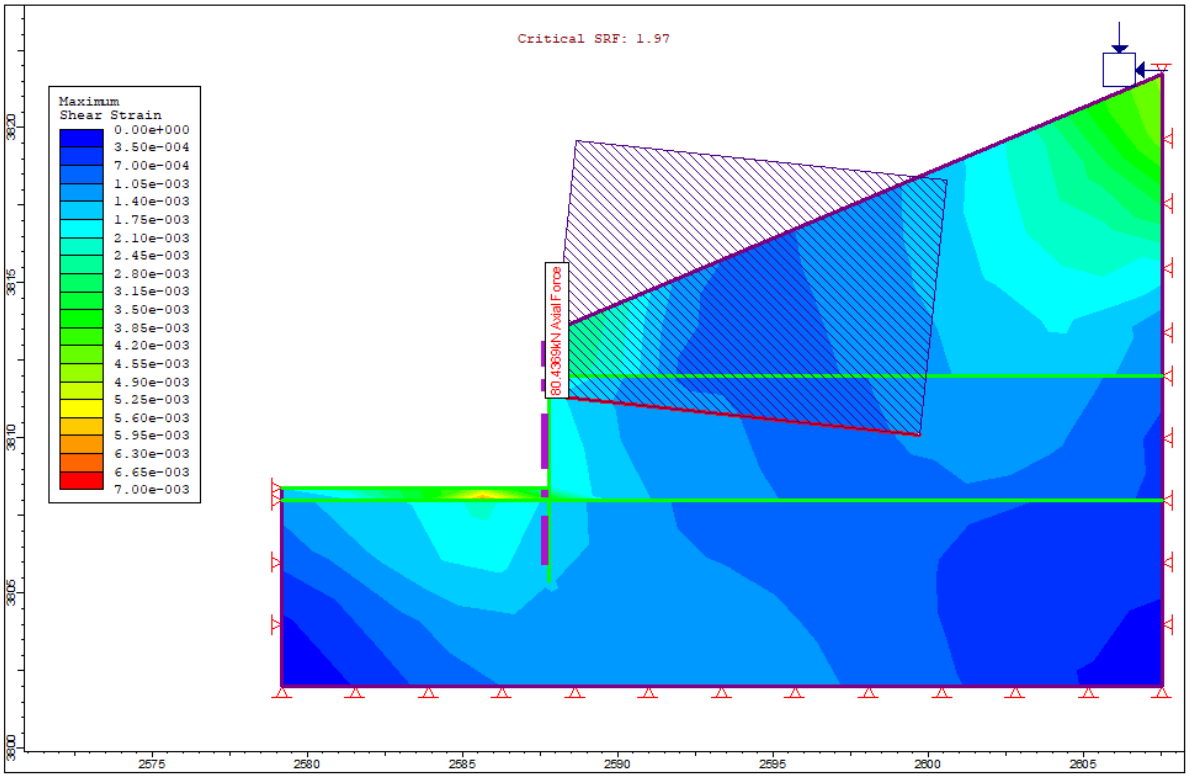
3. Faza: Izkop 1



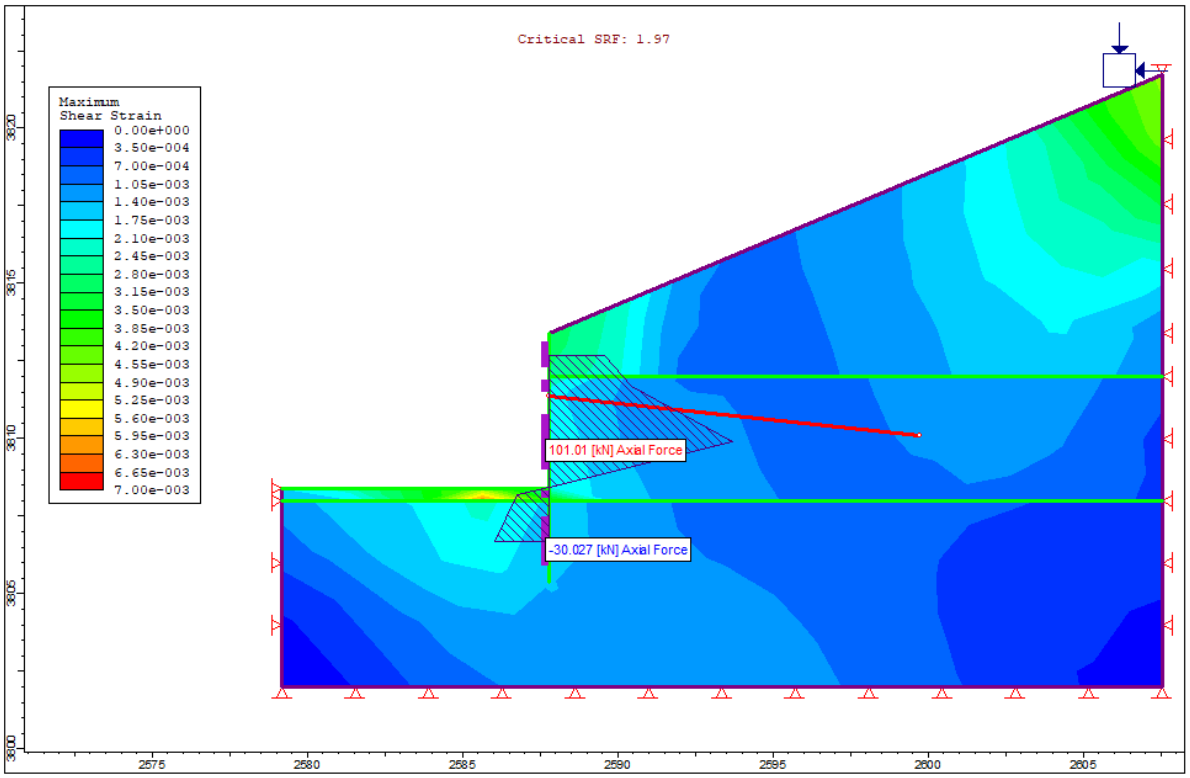
4. Faza: Izkop2 + IBO



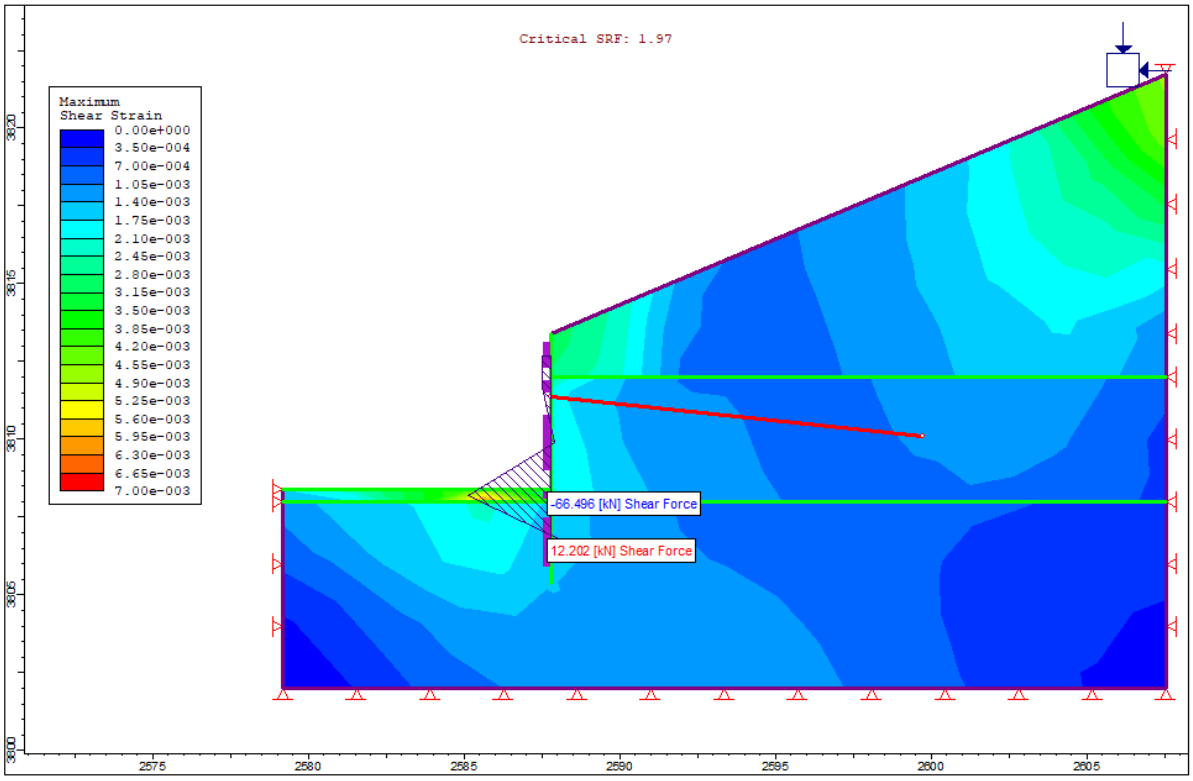
Osna sila v IBO



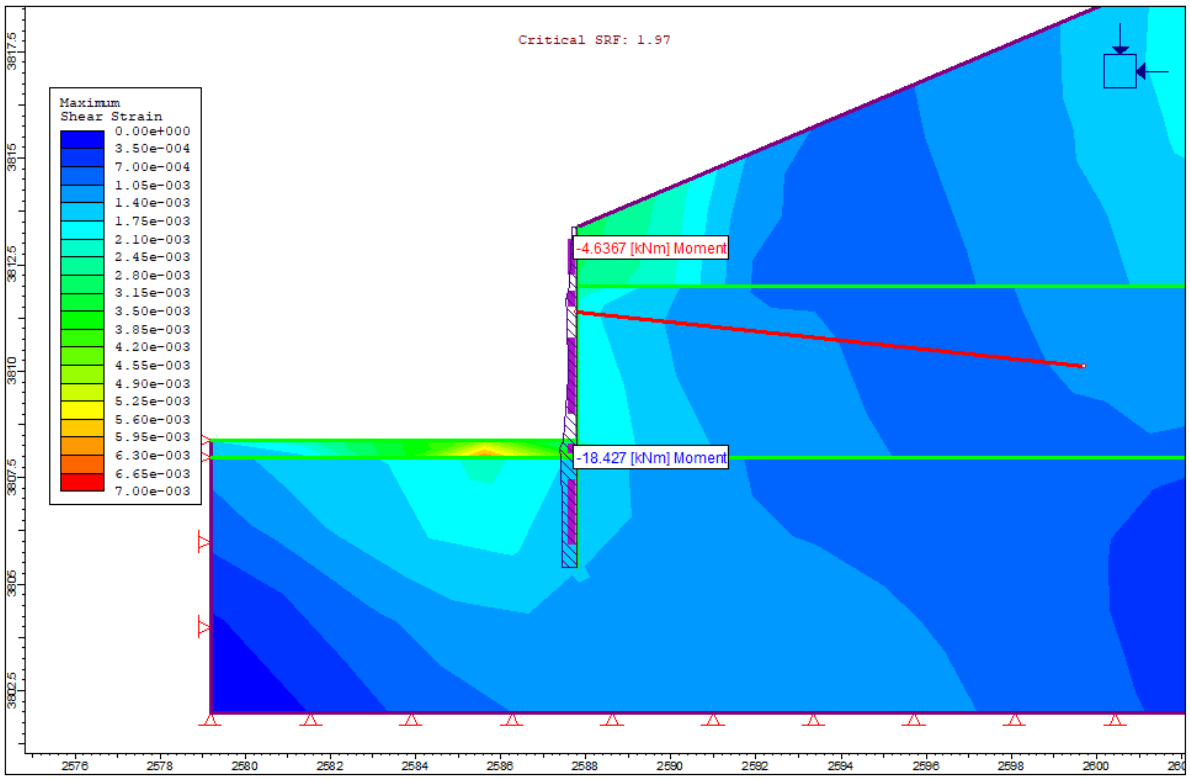
Osna sila v zagatnici



Prečne sile v zagatnici



Momenti v zagatnici



Slide Analysis Information

SLIDE - An Interactive Slope Stability Program

Project Summary

File Name:	1_2
Slide Modeler Version:	7.009
Project Title:	SLIDE - An Interactive Slope Stability Program
Date Created:	11. 12. 2017, 17:03:15

General Settings

Units of Measurement:	Metric Units
Time Units:	days
Permeability Units:	meters/second
Failure Direction:	Right to Left
Data Output:	Standard
Maximum Material Properties:	20
Maximum Support Properties:	20

Analysis Options

Slices Type:	Vertical

Analysis Methods Used
Bishop simplified
Janbu simplified

Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [kN/m3]:	9.81
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type: Circular
Search Method: Grid Search
Radius Increment: 10
Composite Surfaces: Disabled
Reverse Curvature: Invalid Surfaces
Minimum Elevation: Not Defined
Minimum Depth: Not Defined
Minimum Area: Not Defined
Minimum Weight: Not Defined

Seismic

Advanced Seismic Analysis: No
Staged pseudostatic analysis: No

Material Properties

Property	IG0	IG1	IG2
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [kN/m3]	20	19	21
Cohesion [kPa]	0	6.5	0
Friction Angle [deg]	28	18.4	39
Water Surface	None	None	None
Ru Value	0	0	0

Global Minimums

Method: bishop simplified

FS	1.064850
Center:	4222.237, 4639.516
Radius:	14.452
Left Slip Surface Endpoint:	4228.031, 4626.276
Right Slip Surface Endpoint:	4229.353, 4626.937
Resisting Moment:	.5614 kN-m
Driving Moment:	.40541 kN-m
Total Slice Area:	.0186231 m2

Method: janbu simplified

FS	1.064120
Center:	4222.237, 4639.516
Radius:	14.452
Left Slip Surface Endpoint:	4228.031, 4626.276
Right Slip Surface Endpoint:	4229.353, 4626.937
Resisting Horizontal Force:	.158476 kN
Driving Horizontal Force:	.148928 kN
Total Slice Area:	.0186231 m2

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 4730
Number of Invalid Surfaces: 122

Error Codes:

Error Code -108 reported for 38 surfaces

Error Code -112 reported for 84 surfaces

Method: janbu simplified

Number of Valid Surfaces: 4775
Number of Invalid Surfaces: 77

Error Codes:

Error Code -108 reported for 43 surfaces
Error Code -112 reported for 34 surfaces

Error Codes

The following errors were encountered during the computation:

-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.06485

Slice Number	Width [m]	Weight [kN]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [kPa]	Base Friction Angle [degrees]	Shear Stress [kPa]	Shear Strength [kPa]	Base Normal Stress [kPa]	Pore Pressure [kPa]	Effective Normal Stress [kPa]
1	0.0264388	0.00042785	23.6913	IG0	0	28	0.00662837	0.00705822	0.0132746	0	0.0132746
2	0.0264388	0.00126697	23.8058	IG0	0	28	0.0196091	0.0208808	0.039271	0	0.039271
3	0.0264388	0.00207268	23.9204	IG0	0	28	0.0320478	0.0341261	0.0641818	0	0.0641818
4	0.0264388	0.00284486	24.0351	IG0	0	28	0.0439441	0.0467939	0.0880065	0	0.0880065
5	0.0264388	0.00358351	24.1499	IG0	0	28	0.0552997	0.0588859	0.110748	0	0.110748
6	0.0264388	0.00428841	24.2649	IG0	0	28	0.0661125	0.0703999	0.132403	0	0.132403
7	0.0264388	0.00495967	24.3799	IG0	0	28	0.0763858	0.0813394	0.152977	0	0.152977
8	0.0264388	0.00559706	24.495	IG0	0	28	0.0861176	0.0917023	0.172467	0	0.172467
9	0.0264388	0.00620041	24.6103	IG0	0	28	0.0953064	0.101487	0.19087	0	0.19087
10	0.0264388	0.00676986	24.7256	IG0	0	28	0.103956	0.110698	0.208193	0	0.208193
11	0.0264388	0.00730511	24.8411	IG0	0	28	0.112065	0.119332	0.224431	0	0.224431
12	0.0264388	0.0078062	24.9566	IG0	0	28	0.119633	0.127391	0.239587	0	0.239587
13	0.0264388	0.0082729	25.0723	IG0	0	28	0.126659	0.134873	0.253659	0	0.253659
14	0.0264388	0.00870518	25.1881	IG0	0	28	0.133145	0.141779	0.266647	0	0.266647
15	0.0264388	0.00910301	25.3039	IG0	0	28	0.13909	0.14811	0.278554	0	0.278554
16	0.0264388	0.00946619	25.4199	IG0	0	28	0.144495	0.153865	0.289378	0	0.289378
17	0.0264388	0.00979465	25.536	IG0	0	28	0.149358	0.159044	0.299118	0	0.299118
18	0.0264388	0.0100883	25.6523	IG0	0	28	0.153682	0.163648	0.307777	0	0.307777
19	0.0264388	0.010347	25.7686	IG0	0	28	0.157464	0.167676	0.315353	0	0.315353
20	0.0264388	0.0105708	25.8851	IG0	0	28	0.160707	0.171129	0.321847	0	0.321847
21	0.0264388	0.0107594	26.0016	IG0	0	28	0.16341	0.174007	0.327259	0	0.327259
22	0.0264388	0.0109127	26.1183	IG0	0	28	0.16557	0.176307	0.331586	0	0.331586
23	0.0264388	0.0110308	26.2351	IG0	0	28	0.167192	0.178034	0.334834	0	0.334834
24	0.0264388	0.0111134	26.352	IG0	0	28	0.168273	0.179185	0.336998	0	0.336998
25	0.0264388	0.0111604	26.469	IG0	0	28	0.168813	0.179761	0.338082	0	0.338082
26	0.0264388	0.0111718	26.5862	IG0	0	28	0.168813	0.179761	0.338082	0	0.338082
27	0.0264388	0.0111475	26.7035	IG0	0	28	0.168273	0.179186	0.336999	0	0.336999
28	0.0264388	0.0110873	26.8208	IG0	0	28	0.167193	0.178035	0.334836	0	0.334836
29	0.0264388	0.0109911	26.9384	IG0	0	28	0.165573	0.17631	0.33159	0	0.33159
30	0.0264388	0.0108588	27.056	IG0	0	28	0.163412	0.174009	0.327263	0	0.327263
31	0.0264388	0.0106902	27.1738	IG0	0	28	0.160707	0.171129	0.321848	0	0.321848
32	0.0264388	0.0104854	27.2916	IG0	0	28	0.157465	0.167677	0.315355	0	0.315355
33	0.0264388	0.0102441	27.4097	IG0	0	28	0.153684	0.16365	0.30778	0	0.30778
34	0.0264388	0.00996627	27.5278	IG0	0	28	0.14936	0.159046	0.299122	0	0.299122
35	0.0264388	0.00965171	27.646	IG0	0	28	0.144495	0.153866	0.28938	0	0.28938
36	0.0264388	0.00930037	27.7644	IG0	0	28	0.139091	0.148111	0.278556	0	0.278556
37	0.0264388	0.0089122	27.883	IG0	0	28	0.133146	0.141781	0.26665	0	0.26665
38	0.0264388	0.00848688	28.0016	IG0	0	28	0.126659	0.134873	0.253659	0	0.253659
39	0.0264388	0.00802454	28.1204	IG0	0	28	0.119634	0.127392	0.239589	0	0.239589
40	0.0264388	0.00752475	28.2393	IG0	0	28	0.112065	0.119332	0.224431	0	0.224431
41	0.0264388	0.00698771	28.3583	IG0	0	28	0.103956	0.110698	0.208194	0	0.208194
42	0.0264388	0.00641305	28.4775	IG0	0	28	0.0953064	0.101487	0.19087	0	0.19087
43	0.0264388	0.00580084	28.5968	IG0	0	28	0.0861171	0.0917018	0.172466	0	0.172466
44	0.0264388	0.0051507	28.7163	IG0	0	28	0.0763842	0.0813377	0.152974	0	0.152974
45	0.0264388	0.00446279	28.8359	IG0	0	28	0.0661121	0.0703995	0.132402	0	0.132402
46	0.0264388	0.00373669	28.9556	IG0	0	28	0.0552967	0.0588827	0.110742	0	0.110742
47	0.0264388	0.00297248	29.0754	IG0	0	28	0.0439406	0.0467902	0.0879997	0	0.0879997
48	0.0264388	0.00216994	29.1954	IG0	0	28	0.0320428	0.0341208	0.0641718	0	0.0641718
49	0.0264388	0.00132896	29.3156	IG0	0	28	0.0196032	0.0208745	0.039259	0	0.039259
50	0.0264388	0.000449456	29.4359	IG0	0	28	0.00662269	0.00705217	0.0132632	0	0.0132632

Query 1 (bishop simplified) - Safety Factor: 1.06485

Slice Number	Width [m]	Weight [kN]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [kPa]	Base Friction Angle [degrees]	Shear Stress [kPa]	Shear Strength [kPa]	Base Normal Stress [kPa]	Pore Pressure [kPa]	Effective Normal Stress [kPa]
1	0.0264388	0.00042785	23.6913	IG0	0	28	0.00662837	0.00705822	0.0132746	0	0.0132746
2	0.0264388	0.00126697	23.8058	IG0	0	28	0.0196091	0.0208808	0.039271	0	0.039271
3	0.0264388	0.00207268	23.9204	IG0	0	28	0.0320478	0.0341261	0.0641818	0	0.0641818
4	0.0264388	0.00284486	24.0351	IG0	0	28	0.0439441	0.0467939	0.0880065	0	0.0880065
5	0.0264388	0.00358351	24.1499	IG0	0	28	0.0552997	0.0588859	0.110748	0	0.110748
6	0.0264388	0.00428841	24.2649	IG0	0	28	0.0661125	0.0703999	0.132403	0	0.132403
7	0.0264388	0.00495967	24.3799	IG0	0	28	0.0763858	0.0813394	0.152977	0	0.152977
8	0.0264388	0.00559706	24.495	IG0	0	28	0.0861176	0.0917023	0.172467	0	0.172467
9	0.0264388	0.00620041	24.6103	IG0	0	28	0.0953064	0.101487	0.19087	0	0.19087
10	0.0264388	0.00676986	24.7256	IG0	0	28	0.103956	0.110698	0.208193	0	0.208193
11	0.0264388	0.00730511	24.8411	IG0	0	28	0.112065	0.119332	0.224431	0	0.224431
12	0.0264388	0.0078062	24.9566	IG0	0	28	0.119633	0.127391	0.239587	0	0.239587
13	0.0264388	0.0082729	25.0723	IG0	0	28	0.126659	0.134873	0.253659	0	0.253659
14	0.0264388	0.00870518	25.1881	IG0	0	28	0.133145	0.141779	0.266647	0	0.266647
15	0.0264388	0.00910301	25.3039	IG0	0	28	0.13909	0.14811	0.278554	0	0.278554
16	0.0264388	0.00946619	25.4199	IG0	0	28	0.144495	0.153865	0.289378	0	0.289378
17	0.0264388	0.00979465	25.536	IG0	0	28	0.149358	0.159044	0.299118	0	0.299118
18	0.0264388	0.0100883	25.6523	IG0	0	28	0.153682	0.163648	0.307777	0	0.307777
19	0.0264388	0.010347	25.7686	IG0	0	28	0.157464	0.167676	0.315353	0	0.315353
20	0.0264388	0.0105708	25.8851	IG0	0	28	0.160707	0.171129	0.321847	0	0.321847
21	0.0264388	0.0107594	26.0016	IG0	0	28	0.16341	0.174007	0.327259	0	0.327259
22	0.0264388	0.0109127	26.1183	IG0	0	28	0.16557	0.176307	0.331586	0	0.331586
23	0.0264388	0.0110308	26.2351	IG0	0	28	0.167192	0.178034	0.334834	0	0.334834
24	0.0264388	0.0111134	26.352	IG0	0	28	0.168273	0.179185	0.336998	0	0.336998
25	0.0264388	0.0111604	26.469	IG0	0	28	0.168813	0.179761	0.338082	0	0.338082
26	0.0264388	0.0111718	26.5862	IG0	0	28	0.168813	0.179761	0.338082	0	0.338082
27	0.0264388	0.0111475	26.7035	IG0	0	28	0.168273	0.179186	0.336999	0	0.336999
28	0.0264388	0.0110873	26.8208	IG0	0	28	0.167193	0.178035	0.334836	0	0.334836
29	0.0264388	0.0109911	26.9384	IG0	0	28	0.165573	0.17631	0.33159	0	0.33159
30	0.0264388	0.0108588	27.056	IG0	0	28	0.163412	0.174009	0.327263	0	0.327263
31	0.0264388	0.0106902	27.1738	IG0	0	28	0.160707	0.171129	0.321848	0	0.321848
32	0.0264388	0.0104854	27.2916	IG0	0	28	0.157465	0.167677	0.315355	0	0.315355
33	0.0264388	0.0102441	27.4097	IG0	0	28	0.153684	0.16365	0.30778	0	0.30778
34	0.0264388	0.00996627	27.5278	IG0	0	28	0.14936	0.159046	0.299122	0	0.299122
35	0.0264388	0.00965171	27.646	IG0	0	28	0.144495	0.153866	0.28938	0	0.28938
36	0.0264388	0.00930037	27.7644	IG0	0	28	0.139091	0.148111	0.278556	0	0.278556
37	0.0264388	0.0089122	27.883	IG0	0	28	0.133146	0.141781	0.26665	0	0.26665
38	0.0264388	0.00848688	28.0016	IG0	0	28	0.126659	0.134873	0.253659	0	0.253659
39	0.0264388	0.00802454	28.1204	IG0	0	28	0.119634	0.127392	0.239589	0	0.239589
40	0.0264388	0.00752475	28.2393	IG0	0	28	0.112065	0.119332	0.224431	0	0.224431
41	0.0264388	0.00698771	28.3583	IG0	0	28	0.103956	0.110698	0.208194	0	0.208194
42	0.0264388	0.00641305	28.4775	IG0	0	28	0.0953064	0.101487	0.19087	0	0.19087
43	0.0264388	0.00580084	28.5968	IG0	0	28	0.0861171	0.0917018	0.172466	0	0.172466
44	0.0264388	0.0051507	28.7163	IG0	0	28	0.0763842	0.0813377	0.152974	0	0.152974
45	0.0264388	0.00446279	28.8359	IG0	0	28	0.0661121	0.0703995	0.132402	0	0.132402
46	0.0264388	0.00373669	28.9556	IG0	0	28	0.0552967	0.0588827	0.110742	0	0.110742
47	0.0264388	0.00297248	29.0754	IG0	0	28	0.0439406	0.0467902	0.0879997	0	0.0879997
48	0.0264388	0.00216994	29.1954	IG0	0	28	0.0320428	0.0341208	0.0641718	0	0.0641718
49	0.0264388	0.00132896	29.3156	IG0	0	28	0.0196032	0.0208745	0.039259	0	0.039259
50	0.0264388	0.000449456	29.4359	IG0	0	28	0.00662269	0.00705217	0.0132632	0	0.0132632

Global Minimum Query (janbu simplified) - Safety Factor: 1.06412

Slice Number	Width [m]	Weight [kN]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [kPa]	Base Friction Angle [degrees]	Shear Stress [kPa]	Shear Strength [kPa]	Base Normal Stress [kPa]	Pore Pressure [kPa]	Effective Normal Stress [kPa]
1	0.0264388	0.00042785	23.6913	IG0	0	28	0.00663198	0.00705722	0.0132727	0	0.0132727
2	0.0264388	0.00126697	23.8058	IG0	0	28	0.0196198	0.0208778	0.0392654	0	0.0392654
3	0.0264388	0.00207268	23.9204	IG0	0	28	0.0320652	0.0341212	0.0641728	0	0.0641728
4	0.0264388	0.00284486	24.0351	IG0	0	28	0.043968	0.0467872	0.087994	0	0.087994
5	0.0264388	0.00358351	24.1499	IG0	0	28	0.0553297	0.0588774	0.110732	0	0.110732
6	0.0264388	0.00428841	24.2649	IG0	0	28	0.0661483	0.0703897	0.132384	0	0.132384
7	0.0264388	0.00495967	24.3799	IG0	0	28	0.0764271	0.0813276	0.152955	0	0.152955
8	0.0264388	0.00559706	24.495	IG0	0	28	0.0861641	0.0916889	0.172442	0	0.172442
9	0.0264388	0.00620041	24.6103	IG0	0	28	0.0953577	0.101472	0.190842	0	0.190842
10	0.0264388	0.00676986	24.7256	IG0	0	28	0.104013	0.110682	0.208162	0	0.208162
11	0.0264388	0.00730511	24.8411	IG0	0	28	0.112125	0.119314	0.224398	0	0.224398
12	0.0264388	0.0078062	24.9566	IG0	0	28	0.119697	0.127372	0.239552	0	0.239552
13	0.0264388	0.0082729	25.0723	IG0	0	28	0.126727	0.134853	0.253621	0	0.253621
14	0.0264388	0.00870518	25.1881	IG0	0	28	0.133215	0.141757	0.266607	0	0.266607
15	0.0264388	0.00910301	25.3039	IG0	0	28	0.139165	0.148088	0.278512	0	0.278512
16	0.0264388	0.00946619	25.4199	IG0	0	28	0.144572	0.153842	0.289334	0	0.289334
17	0.0264388	0.00979465	25.536	IG0	0	28	0.149438	0.15902	0.299073	0	0.299073
18	0.0264388	0.0100883	25.6523	IG0	0	28	0.153764	0.163623	0.307731	0	0.307731
19	0.0264388	0.010347	25.7686	IG0	0	28	0.157548	0.16765	0.315305	0	0.315305
20	0.0264388	0.0105708	25.8851	IG0	0	28	0.160793	0.171103	0.321798	0	0.321798
21	0.0264388	0.0107594	26.0016	IG0	0	28	0.163497	0.17398	0.327208	0	0.327208
22	0.0264388	0.0109127	26.1183	IG0	0	28	0.165658	0.17628	0.331534	0	0.331534
23	0.0264388	0.0110308	26.2351	IG0	0	28	0.167281	0.178007	0.334782	0	0.334782
24	0.0264388	0.0111134	26.352	IG0	0	28	0.168362	0.179157	0.336946	0	0.336946
25	0.0264388	0.0111604	26.469	IG0	0	28	0.168903	0.179733	0.338028	0	0.338028
26	0.0264388	0.0111718	26.5862	IG0	0	28	0.168903	0.179733	0.338028	0	0.338028
27	0.0264388	0.0111475	26.7035	IG0	0	28	0.168362	0.179157	0.336946	0	0.336946
28	0.0264388	0.0110873	26.8208	IG0	0	28	0.167281	0.178007	0.334783	0	0.334783
29	0.0264388	0.0109911	26.9384	IG0	0	28	0.16566	0.176282	0.331537	0	0.331537
30	0.0264388	0.0108588	27.056	IG0	0	28	0.163498	0.173981	0.32721	0	0.32721
31	0.0264388	0.0106902	27.1738	IG0	0	28	0.160792	0.171102	0.321796	0	0.321796
32	0.0264388	0.0104854	27.2916	IG0	0	28	0.157548	0.16765	0.315304	0	0.315304
33	0.0264388	0.0102441	27.4097	IG0	0	28	0.153764	0.163623	0.307731	0	0.307731
34	0.0264388	0.00996627	27.5278	IG0	0	28	0.149438	0.15902	0.299074	0	0.299074
35	0.0264388	0.00965171	27.646	IG0	0	28	0.144571	0.153841	0.289333	0	0.289333
36	0.0264388	0.00930037	27.7644	IG0	0	28	0.139163	0.148086	0.27851	0	0.27851
37	0.0264388	0.0089122	27.883	IG0	0	28	0.133215	0.141757	0.266607	0	0.266607
38	0.0264388	0.00848688	28.0016	IG0	0	28	0.126725	0.134851	0.253617	0	0.253617
39	0.0264388	0.00802454	28.1204	IG0	0	28	0.119696	0.127371	0.239549	0	0.239549
40	0.0264388	0.00752475	28.2393	IG0	0	28	0.112123	0.119312	0.224393	0	0.224393
41	0.0264388	0.00698771	28.3583	IG0	0	28	0.104011	0.11068	0.208159	0	0.208159
42	0.0264388	0.00641305	28.4775	IG0	0	28	0.0953558	0.10147	0.190838	0	0.190838
43	0.0264388	0.00580084	28.5968	IG0	0	28	0.0861616	0.0916863	0.172437	0	0.172437
44	0.0264388	0.0051507	28.7163	IG0	0	28	0.0764237	0.081324	0.152948	0	0.152948
45	0.0264388	0.00446279	28.8359	IG0	0	28	0.0661463	0.0703876	0.13238	0	0.13238
46	0.0264388	0.00373669	28.9556	IG0	0	28	0.0553252	0.0588726	0.110723	0	0.110723
47	0.0264388	0.00297248	29.0754	IG0	0	28	0.0439633	0.0467822	0.0879845	0	0.0879845
48	0.0264388	0.00216994	29.1954	IG0	0	28	0.0320593	0.0341149	0.0641609	0	0.0641609
49	0.0264388	0.00132896	29.3156	IG0	0	28	0.0196133	0.0208709	0.0392524	0	0.0392524
50	0.0264388	0.000449456	29.4359	IG0	0	28	0.00662609	0.00705095	0.0132609	0	0.0132609

Query 1 (janbu simplified) - Safety Factor: 1.06412

Slice Number	Width [m]	Weight [kN]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [kPa]	Base Friction Angle [degrees]	Shear Stress [kPa]	Shear Strength [kPa]	Base Normal Stress [kPa]	Pore Pressure [kPa]	Effective Normal Stress [kPa]
1	0.0264388	0.00042785	23.6913	IG0	0	28	0.00663198	0.00705722	0.0132727	0	0.0132727
2	0.0264388	0.00126697	23.8058	IG0	0	28	0.0196198	0.0208778	0.0392654	0	0.0392654
3	0.0264388	0.00207268	23.9204	IG0	0	28	0.0320652	0.0341212	0.0641728	0	0.0641728
4	0.0264388	0.00284486	24.0351	IG0	0	28	0.043968	0.0467872	0.087994	0	0.087994
5	0.0264388	0.00358351	24.1499	IG0	0	28	0.0553297	0.0588774	0.110732	0	0.110732
6	0.0264388	0.00428841	24.2649	IG0	0	28	0.0661483	0.0703897	0.132384	0	0.132384
7	0.0264388	0.00495967	24.3799	IG0	0	28	0.0764271	0.0813276	0.152955	0	0.152955
8	0.0264388	0.00559706	24.495	IG0	0	28	0.0861641	0.0916889	0.172442	0	0.172442
9	0.0264388	0.00620041	24.6103	IG0	0	28	0.0953577	0.101472	0.190842	0	0.190842
10	0.0264388	0.00676986	24.7256	IG0	0	28	0.104013	0.110682	0.208162	0	0.208162
11	0.0264388	0.00730511	24.8411	IG0	0	28	0.112125	0.119314	0.224398	0	0.224398
12	0.0264388	0.0078062	24.9566	IG0	0	28	0.119697	0.127372	0.239552	0	0.239552
13	0.0264388	0.0082729	25.0723	IG0	0	28	0.126727	0.134853	0.253621	0	0.253621
14	0.0264388	0.00870518	25.1881	IG0	0	28	0.133215	0.141757	0.266607	0	0.266607
15	0.0264388	0.00910301	25.3039	IG0	0	28	0.139165	0.148088	0.278512	0	0.278512
16	0.0264388	0.00946619	25.4199	IG0	0	28	0.144572	0.153842	0.289334	0	0.289334
17	0.0264388	0.00979465	25.536	IG0	0	28	0.149438	0.15902	0.299073	0	0.299073
18	0.0264388	0.0100883	25.6523	IG0	0	28	0.153764	0.163623	0.307731	0	0.307731
19	0.0264388	0.010347	25.7686	IG0	0	28	0.157548	0.16765	0.315305	0	0.315305
20	0.0264388	0.0105708	25.8851	IG0	0	28	0.160793	0.171103	0.321798	0	0.321798
21	0.0264388	0.0107594	26.0016	IG0	0	28	0.163497	0.17398	0.327208	0	0.327208
22	0.0264388	0.0109127	26.1183	IG0	0	28	0.165658	0.17628	0.331534	0	0.331534
23	0.0264388	0.0110308	26.2351	IG0	0	28	0.167281	0.178007	0.334782	0	0.334782
24	0.0264388	0.0111134	26.352	IG0	0	28	0.168362	0.179157	0.336946	0	0.336946
25	0.0264388	0.0111604	26.469	IG0	0	28	0.168903	0.179733	0.338028	0	0.338028
26	0.0264388	0.0111718	26.5862	IG0	0	28	0.168903	0.179733	0.338028	0	0.338028
27	0.0264388	0.0111475	26.7035	IG0	0	28	0.168362	0.179157	0.336946	0	0.336946
28	0.0264388	0.0110873	26.8208	IG0	0	28	0.167281	0.178007	0.334783	0	0.334783
29	0.0264388	0.0109911	26.9384	IG0	0	28	0.16566	0.176282	0.331537	0	0.331537
30	0.0264388	0.0108588	27.056	IG0	0	28	0.163498	0.173981	0.32721	0	0.32721
31	0.0264388	0.0106902	27.1738	IG0	0	28	0.160792	0.171102	0.321796	0	0.321796
32	0.0264388	0.0104854	27.2916	IG0	0	28	0.157548	0.16765	0.315304	0	0.315304
33	0.0264388	0.0102441	27.4097	IG0	0	28	0.153764	0.163623	0.307731	0	0.307731
34	0.0264388	0.00996627	27.5278	IG0	0	28	0.149438	0.15902	0.299074	0	0.299074
35	0.0264388	0.00965171	27.646	IG0	0	28	0.144571	0.153841	0.289333	0	0.289333
36	0.0264388	0.00930037	27.7644	IG0	0	28	0.139163	0.148086	0.27851	0	0.27851
37	0.0264388	0.0089122	27.883	IG0	0	28	0.133215	0.141757	0.266607	0	0.266607
38	0.0264388	0.00848688	28.0016	IG0	0	28	0.126725	0.134851	0.253617	0	0.253617
39	0.0264388	0.00802454	28.1204	IG0	0	28	0.119696	0.127371	0.239549	0	0.239549
40	0.0264388	0.00752475	28.2393	IG0	0	28	0.112123	0.119312	0.224393	0	0.224393
41	0.0264388	0.00698771	28.3583	IG0	0	28	0.104011	0.11068	0.208159	0	0.208159
42	0.0264388	0.00641305	28.4775	IG0	0	28	0.0953558	0.10147	0.190838	0	0.190838
43	0.0264388	0.00580084	28.5968	IG0	0	28	0.0861616	0.0916863	0.172437	0	0.172437
44	0.0264388	0.0051507	28.7163	IG0	0	28	0.0764237	0.081324	0.152948	0	0.152948
45	0.0264388	0.00446279	28.8359	IG0	0	28	0.0661463	0.0703876	0.13238	0	0.13238
46	0.0264388	0.00373669	28.9556	IG0	0	28	0.0553252	0.0588726	0.110723	0	0.110723
47	0.0264388	0.00297248	29.0754	IG0	0	28	0.0439633	0.0467822	0.0879845	0	0.0879845
48	0.0264388	0.00216994	29.1954	IG0	0	28	0.0320593	0.0341149	0.0641609	0	0.0641609
49	0.0264388	0.00132896	29.3156	IG0	0	28	0.0196133	0.0208709	0.0392524	0	0.0392524
50	0.0264388	0.000449456	29.4359	IG0	0	28	0.00662609	0.00705095	0.0132609	0	0.0132609

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 1.06485

Slice Number	X coordinate [m]	Y coordinate - Bottom [m]	Interslice Normal Force [kN]	Interslice Shear Force [kN]	Interslice Force Angle [degrees]
1	4228.03	4626.28	0	0	0
2	4228.06	4626.29	2.12243e-005	0	0
3	4228.08	4626.3	8.15365e-005	0	0
4	4228.11	4626.31	0.000176048	0	0
5	4228.14	4626.32	0.000300063	0	0
6	4228.16	4626.33	0.000449083	0	0
7	4228.19	4626.35	0.0006188	0	0
8	4228.22	4626.36	0.000805111	0	0
9	4228.24	4626.37	0.0010041	0	0
10	4228.27	4626.38	0.00121206	0	0
11	4228.3	4626.4	0.00142548	0	0
12	4228.32	4626.41	0.00164103	0	0
13	4228.35	4626.42	0.00185562	0	0
14	4228.37	4626.43	0.00206632	0	0
15	4228.4	4626.44	0.00227043	0	0
16	4228.43	4626.46	0.00246544	0	0
17	4228.45	4626.47	0.00264907	0	0
18	4228.48	4626.48	0.00281921	0	0
19	4228.51	4626.49	0.00297398	0	0
20	4228.53	4626.51	0.00311171	0	0
21	4228.56	4626.52	0.00323093	0	0
22	4228.59	4626.53	0.00333039	0	0
23	4228.61	4626.55	0.00340903	0	0
24	4228.64	4626.56	0.00346605	0	0
25	4228.67	4626.57	0.00350081	0	0
26	4228.69	4626.59	0.00351292	0	0
27	4228.72	4626.6	0.0035022	0	0
28	4228.74	4626.61	0.00346869	0	0
29	4228.77	4626.63	0.00341264	0	0
30	4228.8	4626.64	0.00333454	0	0
31	4228.82	4626.65	0.00323508	0	0
32	4228.85	4626.67	0.00311519	0	0
33	4228.88	4626.68	0.00297602	0	0
34	4228.9	4626.69	0.00281895	0	0
35	4228.93	4626.71	0.00264559	0	0
36	4228.96	4626.72	0.00245777	0	0
37	4228.98	4626.74	0.00225756	0	0
38	4229.01	4626.75	0.00204726	0	0
39	4229.04	4626.76	0.00182941	0	0
40	4229.06	4626.78	0.00160679	0	0
41	4229.09	4626.79	0.0013824	0	0
42	4229.11	4626.81	0.00115949	0	0
43	4229.14	4626.82	0.000941556	0	0
44	4229.17	4626.83	0.000732335	0	0
45	4229.19	4626.85	0.00053581	0	0
46	4229.22	4626.86	0.000356204	0	0
47	4229.25	4626.88	0.000197998	0	0
48	4229.27	4626.89	6.59173e-005	0	0
49	4229.3	4626.91	-3.50569e-005	0	0
50	4229.33	4626.92	-9.96906e-005	0	0
51	4229.35	4626.94	0	0	0

Query 1 (bishop simplified) - Safety Factor: 1.06485

Slice Number	X coordinate [m]	Y coordinate - Bottom [m]	Interslice Normal Force [kN]	Interslice Shear Force [kN]	Interslice Force Angle [degrees]
1	4228.03	4626.28	0	0	0
2	4228.06	4626.29	2.12243e-005	0	0
3	4228.08	4626.3	8.15365e-005	0	0
4	4228.11	4626.31	0.000176048	0	0
5	4228.14	4626.32	0.000300063	0	0
6	4228.16	4626.33	0.000449083	0	0
7	4228.19	4626.35	0.0006188	0	0
8	4228.22	4626.36	0.000805111	0	0
9	4228.24	4626.37	0.0010041	0	0
10	4228.27	4626.38	0.00121206	0	0
11	4228.3	4626.4	0.00142548	0	0
12	4228.32	4626.41	0.00164103	0	0
13	4228.35	4626.42	0.00185562	0	0
14	4228.37	4626.43	0.00206632	0	0
15	4228.4	4626.44	0.00227043	0	0
16	4228.43	4626.46	0.00246544	0	0
17	4228.45	4626.47	0.00264907	0	0
18	4228.48	4626.48	0.00281921	0	0
19	4228.51	4626.49	0.00297398	0	0
20	4228.53	4626.51	0.00311171	0	0
21	4228.56	4626.52	0.00323093	0	0
22	4228.59	4626.53	0.00333039	0	0
23	4228.61	4626.55	0.00340903	0	0
24	4228.64	4626.56	0.00346605	0	0
25	4228.67	4626.57	0.00350081	0	0
26	4228.69	4626.59	0.00351292	0	0
27	4228.72	4626.6	0.0035022	0	0
28	4228.74	4626.61	0.00346869	0	0
29	4228.77	4626.63	0.00341264	0	0
30	4228.8	4626.64	0.00333454	0	0
31	4228.82	4626.65	0.00323508	0	0
32	4228.85	4626.67	0.00311519	0	0
33	4228.88	4626.68	0.00297602	0	0
34	4228.9	4626.69	0.00281895	0	0
35	4228.93	4626.71	0.00264559	0	0
36	4228.96	4626.72	0.00245777	0	0
37	4228.98	4626.74	0.00225756	0	0
38	4229.01	4626.75	0.00204726	0	0
39	4229.04	4626.76	0.00182941	0	0
40	4229.06	4626.78	0.00160679	0	0
41	4229.09	4626.79	0.0013824	0	0
42	4229.11	4626.81	0.00115949	0	0
43	4229.14	4626.82	0.000941556	0	0
44	4229.17	4626.83	0.000732335	0	0
45	4229.19	4626.85	0.00053581	0	0
46	4229.22	4626.86	0.000356204	0	0
47	4229.25	4626.88	0.000197998	0	0
48	4229.27	4626.89	6.59173e-005	0	0
49	4229.3	4626.91	-3.50569e-005	0	0
50	4229.33	4626.92	-9.96906e-005	0	0
51	4229.35	4626.94	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 1.06412

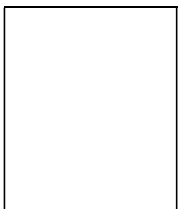
Slice Number	X coordinate [m]	Y coordinate - Bottom [m]	Interslice Normal Force [kN]	Interslice Shear Force [kN]	Interslice Force Angle [degrees]
1	4228.03	4626.28	0	0	0
2	4228.06	4626.29	2.13596e-005	0	0
3	4228.08	4626.3	8.20724e-005	0	0
4	4228.11	4626.31	0.000177239	0	0
5	4228.14	4626.32	0.000302153	0	0
6	4228.16	4626.33	0.000452305	0	0
7	4228.19	4626.35	0.000623378	0	0
8	4228.22	4626.36	0.000811256	0	0
9	4228.24	4626.37	0.00101202	0	0
10	4228.27	4626.38	0.00122193	0	0
11	4228.3	4626.4	0.00143749	0	0
12	4228.32	4626.41	0.00165535	0	0
13	4228.35	4626.42	0.0018724	0	0
14	4228.37	4626.43	0.00208571	0	0
15	4228.4	4626.44	0.00229257	0	0
16	4228.43	4626.46	0.00249046	0	0
17	4228.45	4626.47	0.00267707	0	0
18	4228.48	4626.48	0.0028503	0	0
19	4228.51	4626.49	0.00300825	0	0
20	4228.53	4626.51	0.00314925	0	0
21	4228.56	4626.52	0.0032718	0	0
22	4228.59	4626.53	0.00337465	0	0
23	4228.61	4626.55	0.00345674	0	0
24	4228.64	4626.56	0.00351723	0	0
25	4228.67	4626.57	0.0035555	0	0
26	4228.69	4626.59	0.00357113	0	0
27	4228.72	4626.6	0.00356394	0	0
28	4228.74	4626.61	0.00353395	0	0
29	4228.77	4626.63	0.0034814	0	0
30	4228.8	4626.64	0.00340676	0	0
31	4228.82	4626.65	0.00331073	0	0
32	4228.85	4626.67	0.00319421	0	0
33	4228.88	4626.68	0.00305835	0	0
34	4228.9	4626.69	0.00290451	0	0
35	4228.93	4626.71	0.00273429	0	0
36	4228.96	4626.72	0.00254952	0	0
37	4228.98	4626.74	0.00235224	0	0
38	4229.01	4626.75	0.00214476	0	0
39	4229.04	4626.76	0.00192959	0	0
40	4229.06	4626.78	0.0017095	0	0
41	4229.09	4626.79	0.00148748	0	0
42	4229.11	4626.81	0.00126678	0	0
43	4229.14	4626.82	0.00105087	0	0
44	4229.17	4626.83	0.000843485	0	0
45	4229.19	4626.85	0.000648587	0	0
46	4229.22	4626.86	0.00047039	0	0
47	4229.25	4626.88	0.000313365	0	0
48	4229.27	4626.89	0.000182225	0	0
49	4229.3	4626.91	8.19362e-005	0	0
50	4229.33	4626.92	1.77228e-005	0	0
51	4229.35	4626.94	0	0	0

Query 1 (janbu simplified) - Safety Factor: 1.06412

Slice Number	X coordinate [m]	Y coordinate - Bottom [m]	Interslice Normal Force [kN]	Interslice Shear Force [kN]	Interslice Force Angle [degrees]
1	4228.03	4626.28	0	0	0
2	4228.06	4626.29	2.13596e-005	0	0
3	4228.08	4626.3	8.20724e-005	0	0
4	4228.11	4626.31	0.000177239	0	0
5	4228.14	4626.32	0.000302153	0	0
6	4228.16	4626.33	0.000452305	0	0
7	4228.19	4626.35	0.000623378	0	0
8	4228.22	4626.36	0.000811256	0	0
9	4228.24	4626.37	0.00101202	0	0
10	4228.27	4626.38	0.00122193	0	0
11	4228.3	4626.4	0.00143749	0	0
12	4228.32	4626.41	0.00165535	0	0
13	4228.35	4626.42	0.0018724	0	0
14	4228.37	4626.43	0.00208571	0	0
15	4228.4	4626.44	0.00229257	0	0
16	4228.43	4626.46	0.00249046	0	0
17	4228.45	4626.47	0.00267707	0	0
18	4228.48	4626.48	0.0028503	0	0
19	4228.51	4626.49	0.00300825	0	0
20	4228.53	4626.51	0.00314925	0	0
21	4228.56	4626.52	0.0032718	0	0
22	4228.59	4626.53	0.00337465	0	0
23	4228.61	4626.55	0.00345674	0	0
24	4228.64	4626.56	0.00351723	0	0
25	4228.67	4626.57	0.0035555	0	0
26	4228.69	4626.59	0.00357113	0	0
27	4228.72	4626.6	0.00356394	0	0
28	4228.74	4626.61	0.00353395	0	0
29	4228.77	4626.63	0.0034814	0	0
30	4228.8	4626.64	0.00340676	0	0
31	4228.82	4626.65	0.00331073	0	0
32	4228.85	4626.67	0.00319421	0	0
33	4228.88	4626.68	0.00305835	0	0
34	4228.9	4626.69	0.00290451	0	0
35	4228.93	4626.71	0.00273429	0	0
36	4228.96	4626.72	0.00254952	0	0
37	4228.98	4626.74	0.00235224	0	0
38	4229.01	4626.75	0.00214476	0	0
39	4229.04	4626.76	0.00192959	0	0
40	4229.06	4626.78	0.0017095	0	0
41	4229.09	4626.79	0.00148748	0	0
42	4229.11	4626.81	0.00126678	0	0
43	4229.14	4626.82	0.00105087	0	0
44	4229.17	4626.83	0.000843485	0	0
45	4229.19	4626.85	0.000648587	0	0
46	4229.22	4626.86	0.00047039	0	0
47	4229.25	4626.88	0.000313365	0	0
48	4229.27	4626.89	0.000182225	0	0
49	4229.3	4626.91	8.19362e-005	0	0
50	4229.33	4626.92	1.77228e-005	0	0
51	4229.35	4626.94	0	0	0

List Of Coordinates

External Boundary



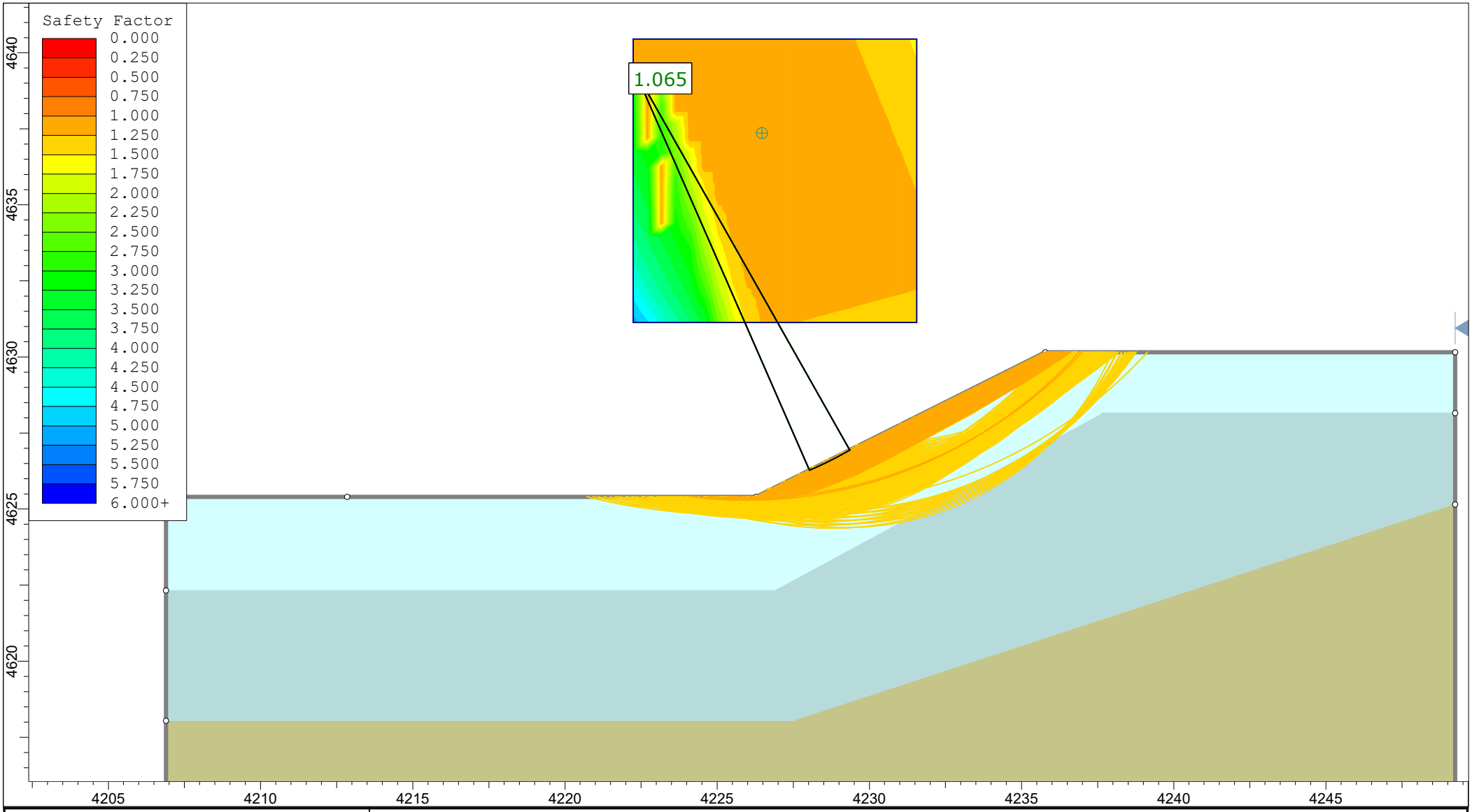
X	Y
4206.89	4625.4
4206.89	4622.32
4206.89	4618.04
4206.89	4605.03
4249.25	4605.03
4249.25	4625.15
4249.25	4628.15
4249.25	4630.15
4235.78	4630.15
4226.28	4625.4
4212.84	4625.4

Material Boundary

X	Y
4206.89	4622.32
4226.86	4622.32
4237.64	4628.15
4249.25	4628.15

Material Boundary

X	Y
4206.89	4618.04
4227.54	4618.04
4249.25	4625.15



rocscience	Project: SLIDE - An Interactive Slope Stability Program	
	Analysis Description:	
	Drawn By:	Company:
SLIDEINTERPRET 7.009	Date: 11. 12. 2017, 17:03:15	File Name: 1_2.slim