Slope stability analysis

Input data

Project

Task : Zemeljski plaz na parceli *191 k.o. Zgornje Grušovje pri hiši Zgornje Grušovje 10b
Description : Povratna stabilnostna analiza
Customer : Občina Oplotnica
Author : GEOING d.o.o.
Date : 08/04/2025

Settings

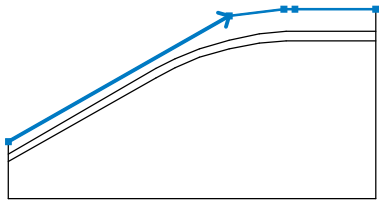
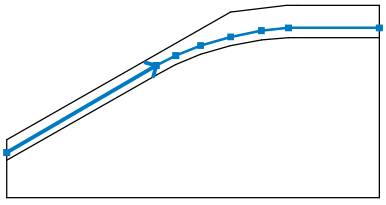
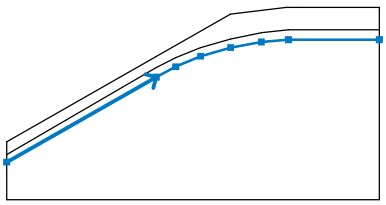
Slovenia - EN 1997 (49)

Stability analysis

Earthquake analysis : Standard
Verification methodology : Safety factors (ASD)

Safety factors			
Permanent design situation			
Safety factor :	SF_s =	1,50	[–]

Interface

No.	Interface location	Coordinates of interface points [m]					
		x	z	x	z	x	z
1		0,00	2,70	29,80	19,70	37,20	20,60
		38,70	20,60	49,60	20,60		
2		0,00	1,00	19,90	12,60	22,50	13,90
		25,80	15,25	29,80	16,40	33,90	17,25
		37,50	17,60	49,60	17,60		
3		0,00	0,00	19,90	11,30	22,50	12,70
		25,80	14,10	29,80	15,25	33,90	16,00
		37,50	16,30	49,60	16,30		

Soil parameters - effective stress state

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m^3]
1	Glina		21,00	3,00	19,00
2	Preperina		30,00	10,00	21,00

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No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m^3]
3	Hribina		34,00	30,00	23,00

Soil parameters - uplift

No.	Name	Pattern	γ_{sat} [kN/m^3]	γ_s [kN/m^3]	n [–]
1	Glina		19,00		
2	Preperina		21,00		
3	Hribina		23,00		

Soil parameters

Glina

Unit weight : γ = 19,00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 21,00 °
Cohesion of soil : c_{ef} = 3,00 kPa
Saturated unit weight : γ_{sat} = 19,00 kN/m^3

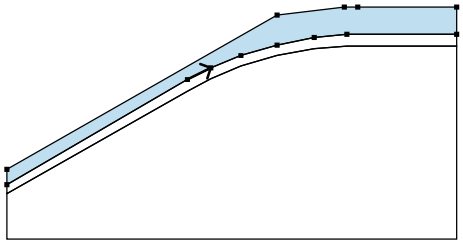
Preperina

Unit weight : γ = 21,00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 30,00 °
Cohesion of soil : c_{ef} = 10,00 kPa
Saturated unit weight : γ_{sat} = 21,00 kN/m^3

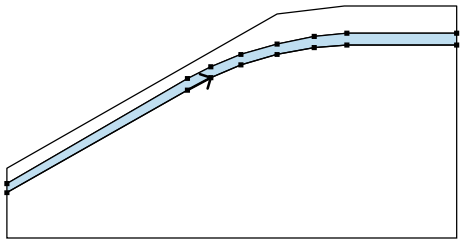
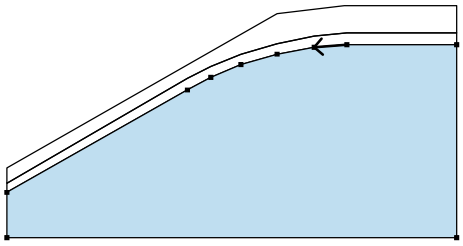
Hribina

Unit weight : γ = 23,00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 34,00 °
Cohesion of soil : c_{ef} = 30,00 kPa
Saturated unit weight : γ_{sat} = 23,00 kN/m^3

Assigning and surfaces

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		19,90	12,60	22,50	13,90	Glina
		25,80	15,25	29,80	16,40	
		33,90	17,25	37,50	17,60	
		49,60	17,60	49,60	20,60	
		38,70	20,60	37,20	20,60	
		29,80	19,70	0,00	2,70	
		0,00	1,00			

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No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
2		19,90	11,30	22,50	12,70	Preperina
		25,80	14,10	29,80	15,25	
		33,90	16,00	37,50	16,30	
		49,60	16,30	49,60	17,60	
		37,50	17,60	33,90	17,25	
		29,80	16,40	25,80	15,25	
		22,50	13,90	19,90	12,60	
		0,00	1,00	0,00	0,00	
3		37,50	16,30	33,90	16,00	Hribina
		29,80	15,25	25,80	14,10	
		22,50	12,70	19,90	11,30	
		0,00	0,00	0,00	-5,00	
		49,60	-5,00	49,60	16,30	

Water

Water type : No water

Tensile crack

Tensile crack not input.

Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Stage of construction 1)

Analysis 1

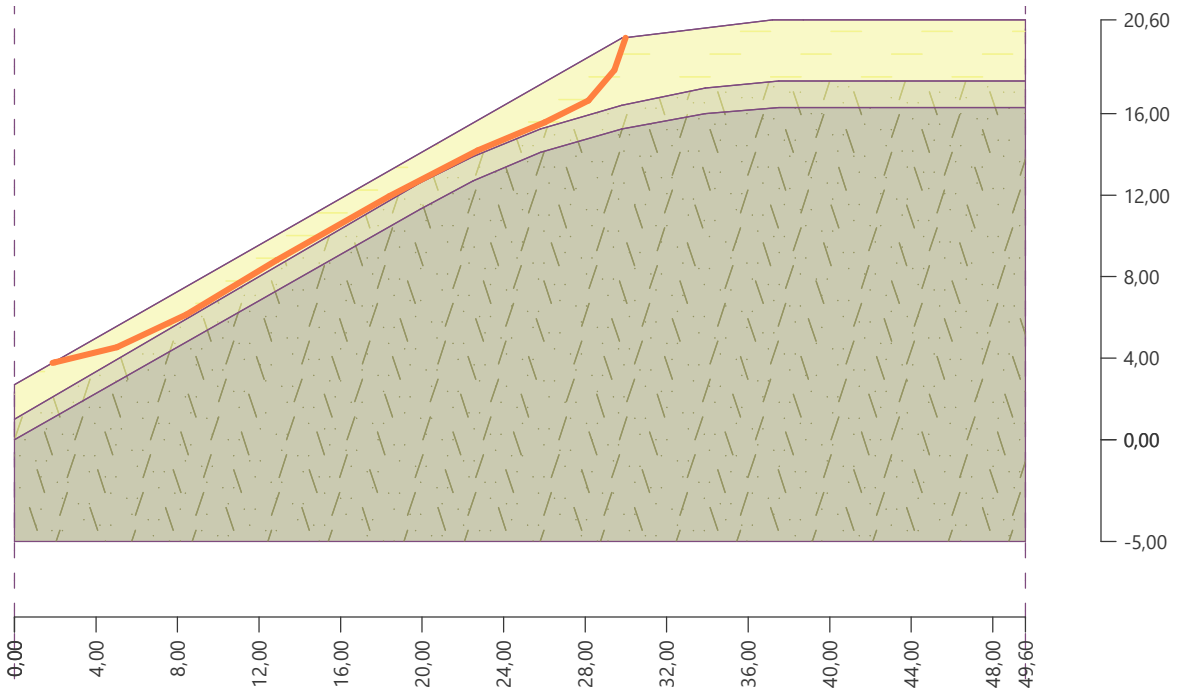
Polygonal slip surface

Coordinates of slip surface points [m]									
x	z	x	z	x	z	x	z	x	z
1,87	3,77	2,00	3,80	5,02	4,54	8,43	6,14	12,86	8,81
18,40	11,95	22,72	14,19	26,03	15,58	28,16	16,64	29,44	18,14
29,99	19,72								
Analysis of the slip surface without optimization.									

Slope stability verification (Janbu)
Factor of safety = 1,00 < 1,50
Slope stability NOT ACCEPTABLE

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Name : Analysis	Stage - analysis : 1 - 1
Description : Drsina 1	



Analysis 2

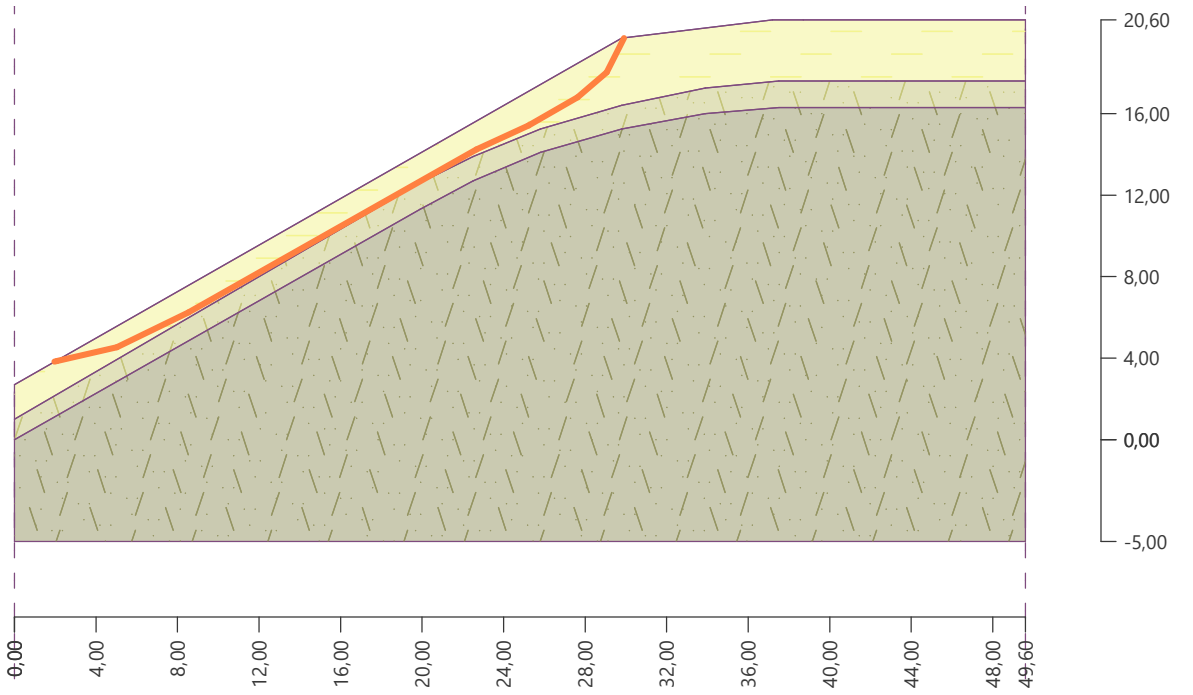
Polygonal slip surface

Coordinates of slip surface points [m]									
x	z	x	z	x	z	x	z	x	z
1,96	3,82	2,09	3,85	5,02	4,54	8,54	6,25	22,67	14,24
25,23	15,42	27,63	16,80	29,06	18,03	29,91	19,71		
Analysis of the slip surface without optimization.									

Slope stability verification (Janbu)
Factor of safety = 1,00 < 1,50
Slope stability NOT ACCEPTABLE

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Name : Analysis	Stage - analysis : 1 - 2
Description : Drsina 2	



Analysis 3

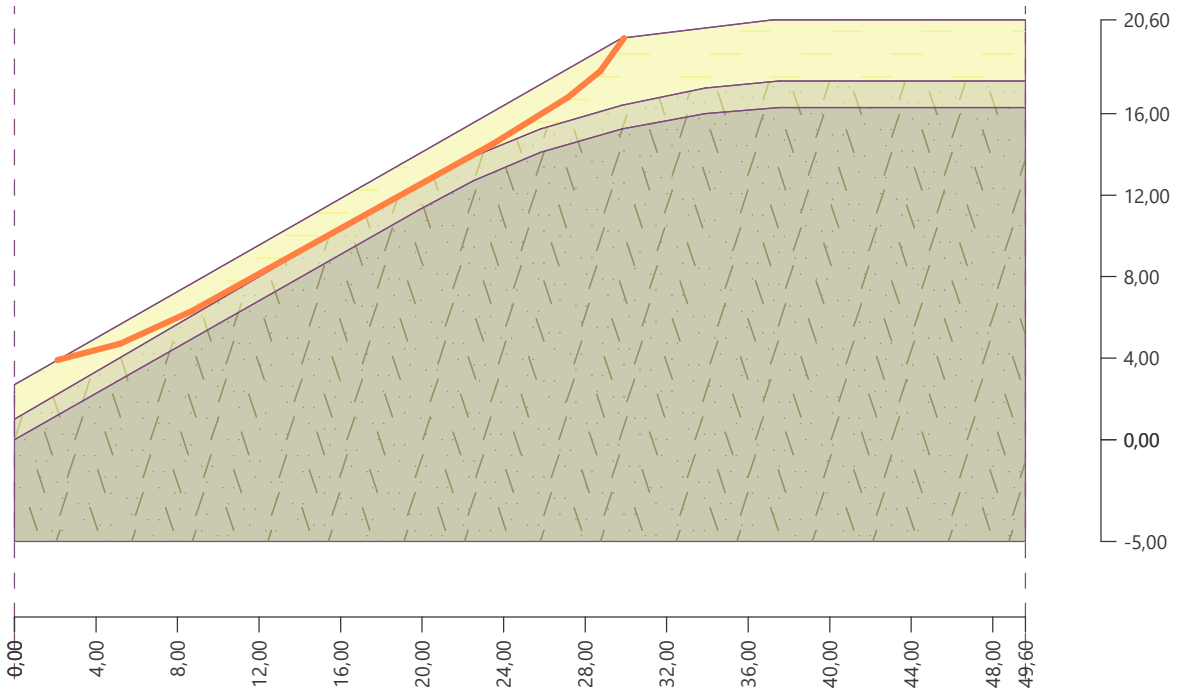
Polygonal slip surface

Coordinates of slip surface points [m]									
x	z	x	z	x	z	x	z	x	z
2,11	3,91	5,18	4,70	8,70	6,30	23,47	14,51	27,15	16,80
28,74	18,08	29,90	19,71						
Analysis of the slip surface without optimization.									

Slope stability verification (Janbu)
Factor of safety = 1,13 < 1,50
Slope stability NOT ACCEPTABLE

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Name : Analysis	Stage - analysis : 1 - 3
Description : Drsina 3	



Analysis 4

Polygonal slip surface

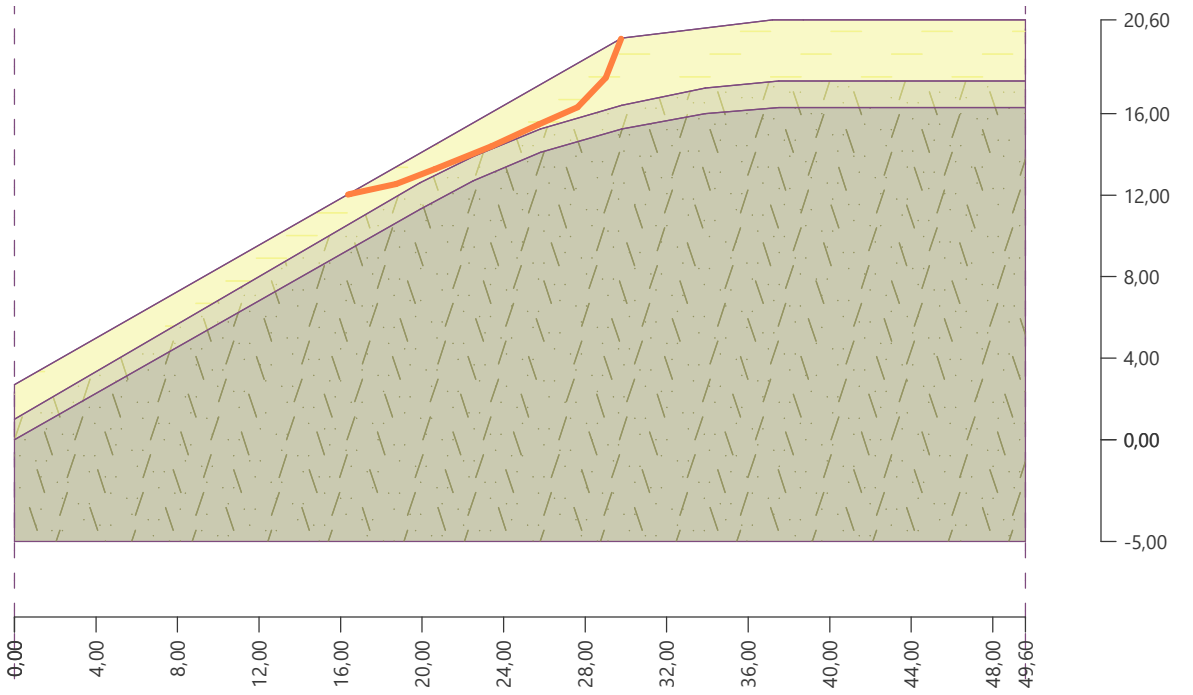
Coordinates of slip surface points [m]									
x	z	x	z	x	z	x	z	x	z
16,36	12,03	16,48	12,06	18,72	12,54	20,64	13,28	23,41	14,40
25,71	15,47	27,63	16,32	29,01	17,76	29,76	19,68		
Analysis of the slip surface without optimization.									

Slope stability verification (Janbu)
Factor of safety = 1,08 < 1,50
Slope stability NOT ACCEPTABLE

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Name : Analysis | **Stage - analysis : 1 - 4**

Description : Drsina 4



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