# Slope stability analysis

## Input data

### Project

Task : Zemeljski plaz na parceli št. 466/2 k.o. 752 pri hiši Okoška gora 51
Part : GP
Description : Povratna stabilnostna analiza
Customer : Občina Oplotnica
Author : GEOING d.o.o.
Date : 28/01/2025

### Settings

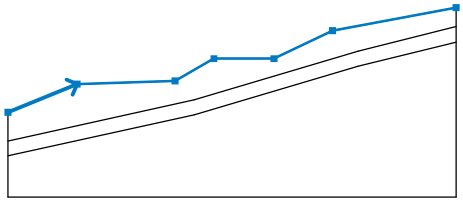
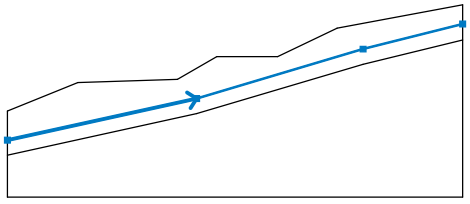
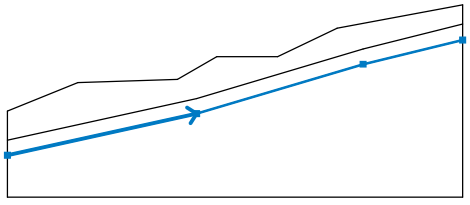
Slovenia - EN 1997 (30)

### 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 | 13,50 | 8,40 | 16,90 | 20,30 | 17,30 |
| | | 25,00 | 20,00 | 32,30 | 20,00 | 39,40 | 23,40 |
| | | 54,40 | 26,20 | | | | |
| 2 |  | 0,00 | 10,00 | 22,60 | 15,00 | 42,50 | 20,90 |
| | | 54,40 | 23,90 | | | | |
| 3 |  | 0,00 | 8,20 | 22,60 | 13,20 | 42,50 | 19,10 |
| | | 54,40 | 22,00 | | | | |

### Soil parameters - effective stress state

| No. | Name | Pattern | $\varphi_{ef}$ [°] | $c_{ef}$ [kPa] | $\gamma$ [kN/m$^3$] |
|---|---|---|---|---|---|
| 1 | Glina | | 14,00 | 0,00 | 19,00 |
| 2 | Preperina | | 30,00 | 10,00 | 21,00 |



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| No. | Name | Pattern | $\varphi_{ef}$ [°] | $c_{ef}$ [kPa] | $\gamma$ [kN/m$^3$] |
|---|---|---|---|---|---|
| 3 | Hribina | | 32,00 | 40,00 | 23,00 |

## Soil parameters - uplift

| No. | Name | Pattern | $\gamma_{sat}$ [kN/m$^3$] | $\gamma_s$ [kN/m$^3$] | n [–] |
|---|---|---|---|---|---|
| 1 | Glina | | 19,00 | | |
| 2 | Preperina | | 21,00 | | |
| 3 | Hribina | | 23,00 | | |

## Soil parameters

**Glina**

Unit weight : $\gamma$ = 19,00 kN/m$^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef}$ = 14,00 °
Cohesion of soil : $c_{ef}$ = 0,00 kPa
Saturated unit weight : $\gamma_{sat}$ = 19,00 kN/m$^3$

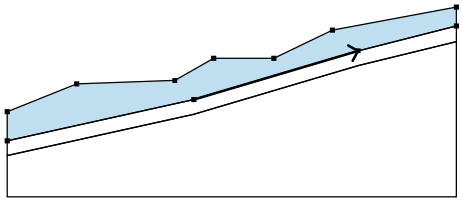
**Preperina**

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

**Hribina**

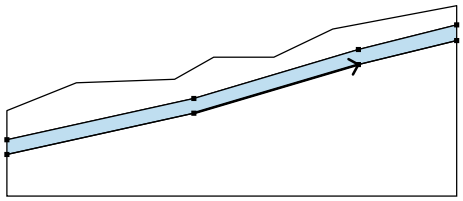
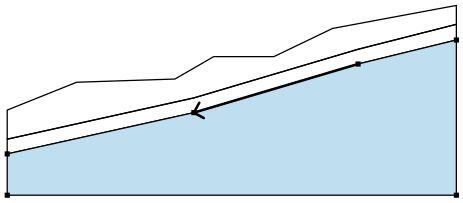
Unit weight : $\gamma$ = 23,00 kN/m$^3$
Stress-state : effective
Angle of internal friction : $\varphi_{ef}$ = 32,00 °
Cohesion of soil : $c_{ef}$ = 40,00 kPa
Saturated unit weight : $\gamma_{sat}$ = 23,00 kN/m$^3$

## Assigning and surfaces

| No. | Surface position | Coordinates of surface points [m] | | | | Assigned soil |
|---|---|---|---|---|---|---|
| | | x | z | x | z | |
| 1 |  | 22,60 | 15,00 | 42,50 | 20,90 | Glina |
| | | 54,40 | 23,90 | 54,40 | 26,20 | |
| | | 39,40 | 23,40 | 32,30 | 20,00 | |
| | | 25,00 | 20,00 | 20,30 | 17,30 | |
| | | 8,40 | 16,90 | 0,00 | 13,50 | |
| | | 0,00 | 10,00 | | | |

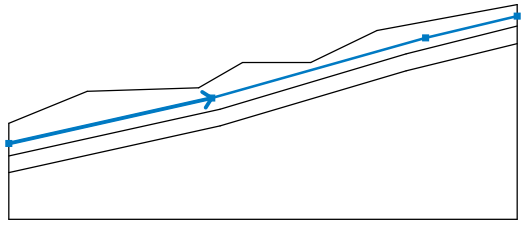


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| No. | Surface position | Coordinates of surface points [m] | | | | Assigned soil |
|---|---|---|---|---|---|---|
| | | x | z | x | z | |
| 2 |  | 22,60 | 13,20 | 42,50 | 19,10 | Preperina |
| | | 54,40 | 22,00 | 54,40 | 23,90 | |
| | | 42,50 | 20,90 | 22,60 | 15,00 | |
| | | 0,00 | 10,00 | 0,00 | 8,20 | |
| 3 |  | 42,50 | 19,10 | 22,60 | 13,20 | Hribina |
| | | 0,00 | 8,20 | 0,00 | 3,20 | |
| | | 54,40 | 3,20 | 54,40 | 22,00 | |

## Water

Water type : GWT

| No. | GWT location | Coordinates of GWT points [m] | | | | | |
|---|---|---|---|---|---|---|---|
| | | x | z | x | z | x | z |
| 1 |  | 0,00 | 11,32 | 21,71 | 16,20 | 44,61 | 22,62 |
| | | 54,40 | 24,97 | | | | |

## 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**

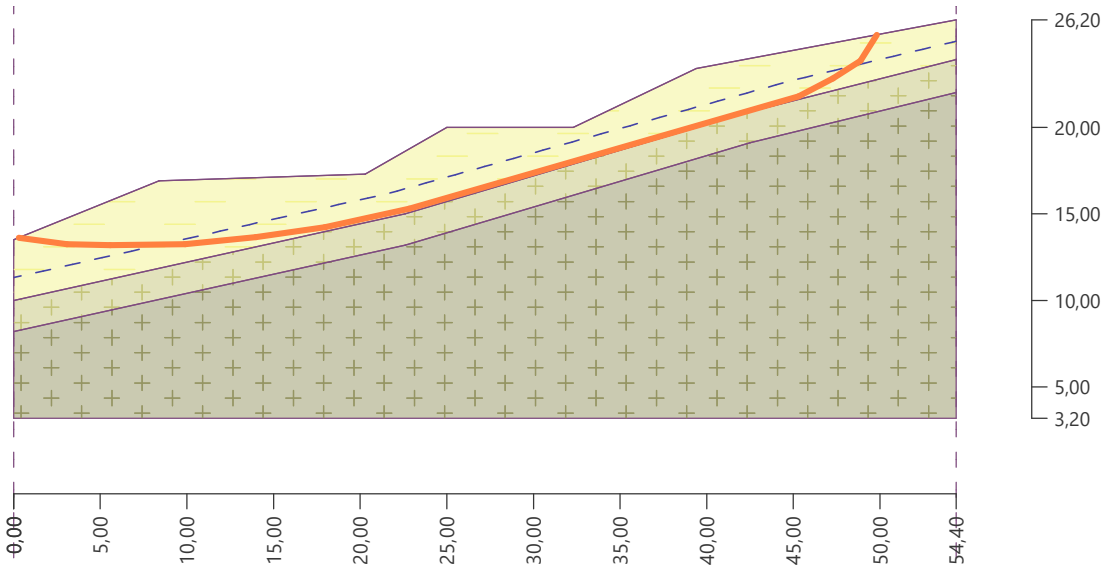
| Coordinates of slip surface points [m] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| x | z | x | z | x | z | x | z | x | z |
| 0,30 | 13,62 | 3,08 | 13,24 | 5,57 | 13,19 | 9,89 | 13,24 | 13,97 | 13,66 |
| 17,96 | 14,23 | 22,84 | 15,30 | 45,31 | 21,78 | 47,28 | 22,81 | 48,88 | 23,84 |
| 49,81 | 25,34 | | | | | | | | |
| Analysis of the slip surface without optimization. | | | | | | | | | |

**Slope stability verification (Morgenstern-Price)**
Factor of safety = 1,00 < 1,50
**Slope stability NOT ACCEPTABLE**



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



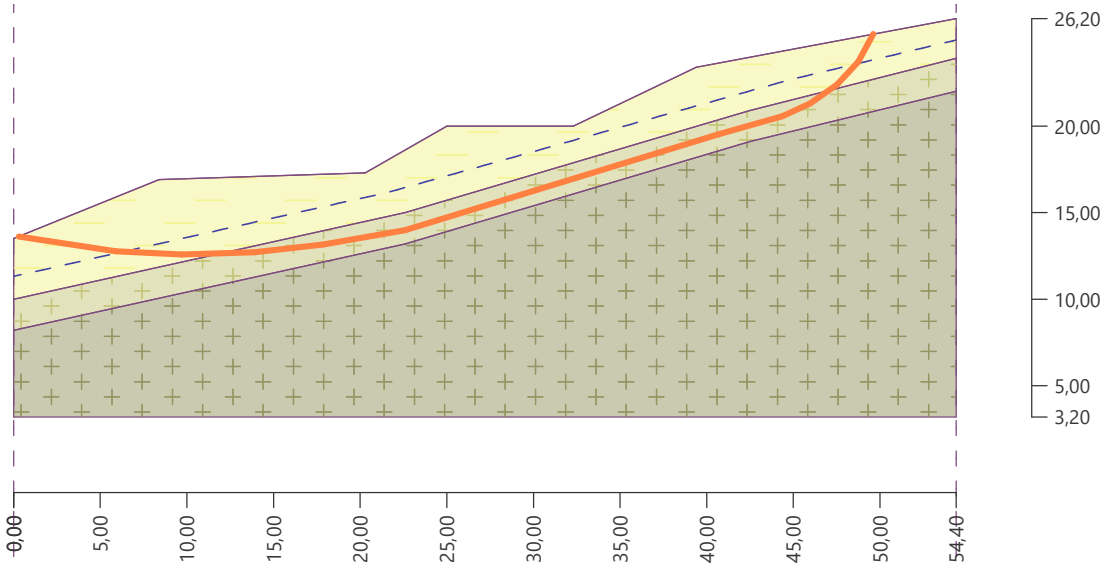

## Analysis 2

### Polygonal slip surface

| Coordinates of slip surface points [m] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| x | z | x | z | x | z | x | z | x | z |
| 0,30 | 13,62 | 5,90 | 12,77 | 9,70 | 12,58 | 13,92 | 12,72 | 17,86 | 13,15 |
| 22,60 | 13,99 | 40,71 | 19,53 | 44,37 | 20,56 | 45,97 | 21,31 | 47,52 | 22,39 |
| 48,74 | 23,70 | 49,61 | 25,31 | | | | | | |
| Analysis of the slip surface without optimization. | | | | | | | | | |

**Slope stability verification (Morgenstern-Price)**
Factor of safety = 2,30 > 1,50
**Slope stability ACCEPTABLE**

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






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