Slope stability analysis

Input data

Project

Task : Sanacija plazu na JP 947814 Okoška gora - Kangler pri hiši Okoška gora 28
Description : Povratna stabilnostna analiza
Customer : Občina Oplotnica
Author : GEOING d.o.o.
Date : 01/04/2025

Settings

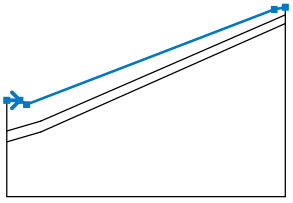
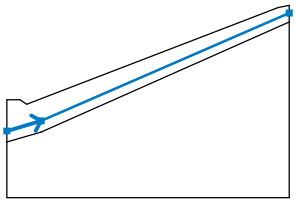
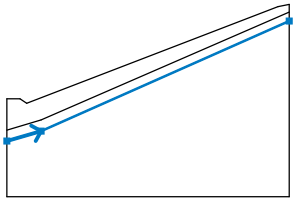
Slovenia - EN 1997 (47)

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	10,10	1,20	10,10	1,80	9,70
		24,40	18,40	25,40	18,60		
2		0,00	7,30	3,10	8,20	25,40	17,90
3		0,00	6,30	3,10	7,20	25,40	17,10

Soil parameters - effective stress state

No.	Name	Pattern	φ_{ef} [°]	c_{ef} [kPa]	γ [kN/m³]
1	Glina		19,00	1,00	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} = 19,00 °
Cohesion of soil : c_{ef} = 1,00 kPa
Saturated unit weight : γ_{sat} = 19,00 kN/m^3

Preperina

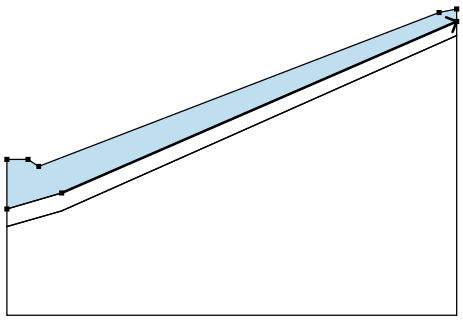
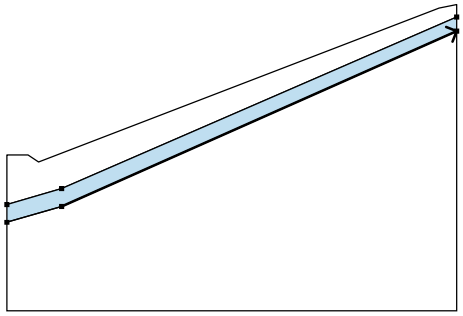
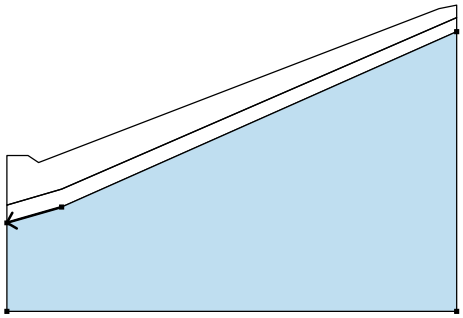
Unit weight : γ = 21,00 kN/m^3
Stress-state : effective
Angle of internal friction : φ_{ef} = 30,00 °
Cohesion of soil : c_{ef} = 10,00 kPa
Saturated unit weight : γ_{sat} = 21,00 kN/m^3

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

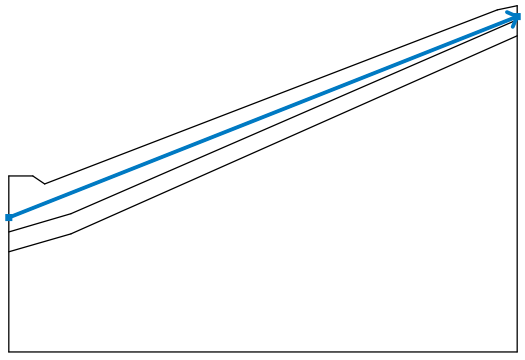
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Assigning and surfaces

No.	Surface position	Coordinates of surface points [m]				Assigned soil
		x	z	x	z	
1		3,10	8,20	25,40	17,90	Glina
		25,40	18,60	24,40	18,40	
		1,80	9,70	1,20	10,10	
		0,00	10,10	0,00	7,30	
2		3,10	7,20	25,40	17,10	Preperina
		25,40	17,90	3,10	8,20	
		0,00	7,30	0,00	6,30	
3		3,10	7,20	0,00	6,30	Hribina
		0,00	1,30	25,40	1,30	
		25,40	17,10			

Water

Water type : GWT

No.	GWT location	Coordinates of GWT points [m]					
		x	z	x	z	x	z
1		0,00	8,02	25,40	18,06		

Tensile crack

Tensile crack not input.

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Earthquake

Earthquake not included.

Settings of the stage of construction

Design situation : permanent

Results (Stage of construction 1)

Analysis 1

Circular slip surface

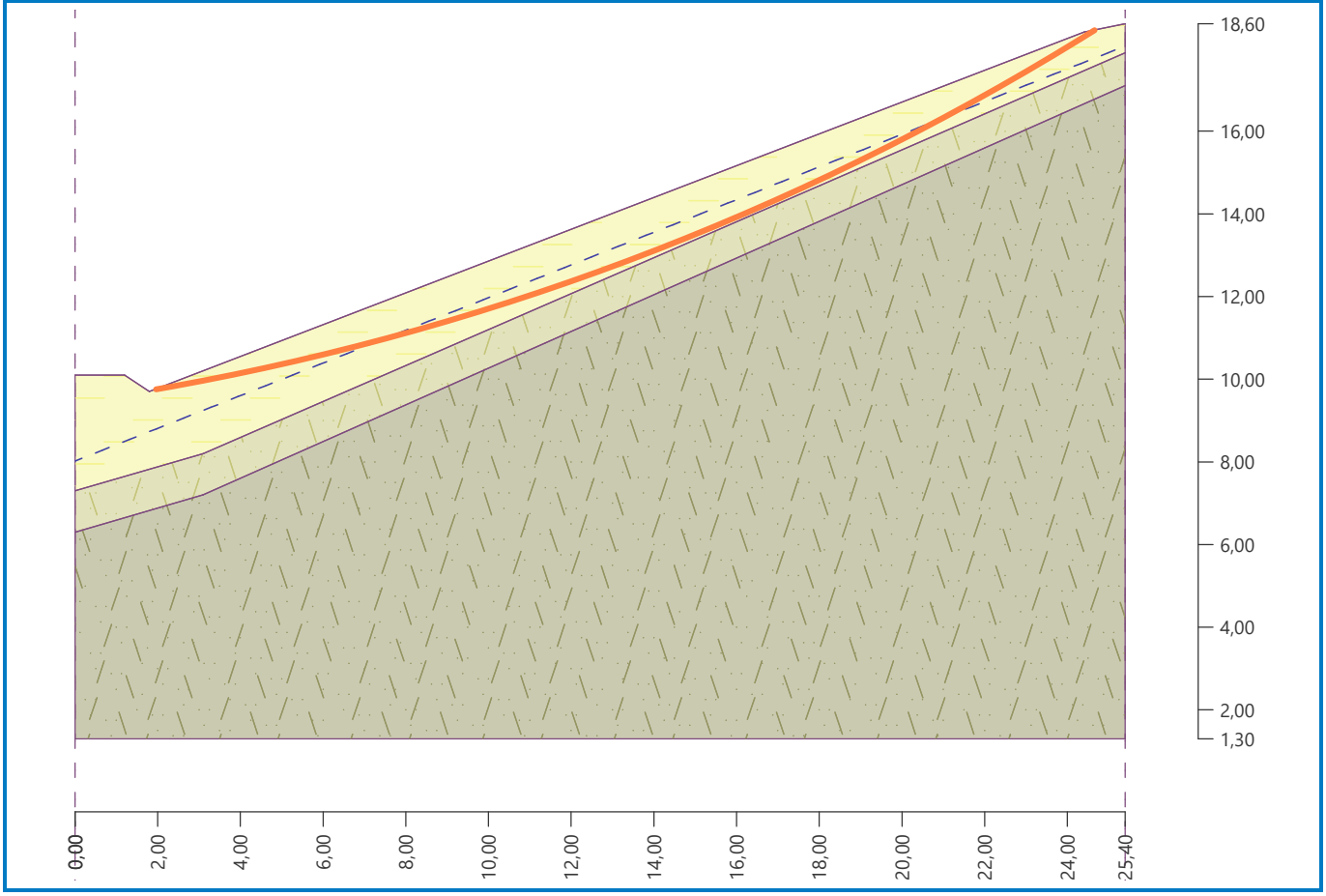
Slip surface parameters							
Center :	x =	-8,96	[m]	Angles :	α_1 =	9,91	[°]
	z =	72,27	[m]		α_2 =	31,99	[°]
Radius :	R =	63,46	[m]				
Analysis of the slip surface without optimization.							

Slope stability verification (Bishop)

Sum of active forces : F_a = 132,52 kN/m
Sum of passive forces : F_p = 132,40 kN/m

Sliding moment : M_a = 8410,04 kNm/m
Resisting moment : M_p = 8402,06 kNm/m
Factor of safety = 1,00 < 1,50
Slope stability NOT ACCEPTABLE

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



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Analysis 2

Circular slip surface

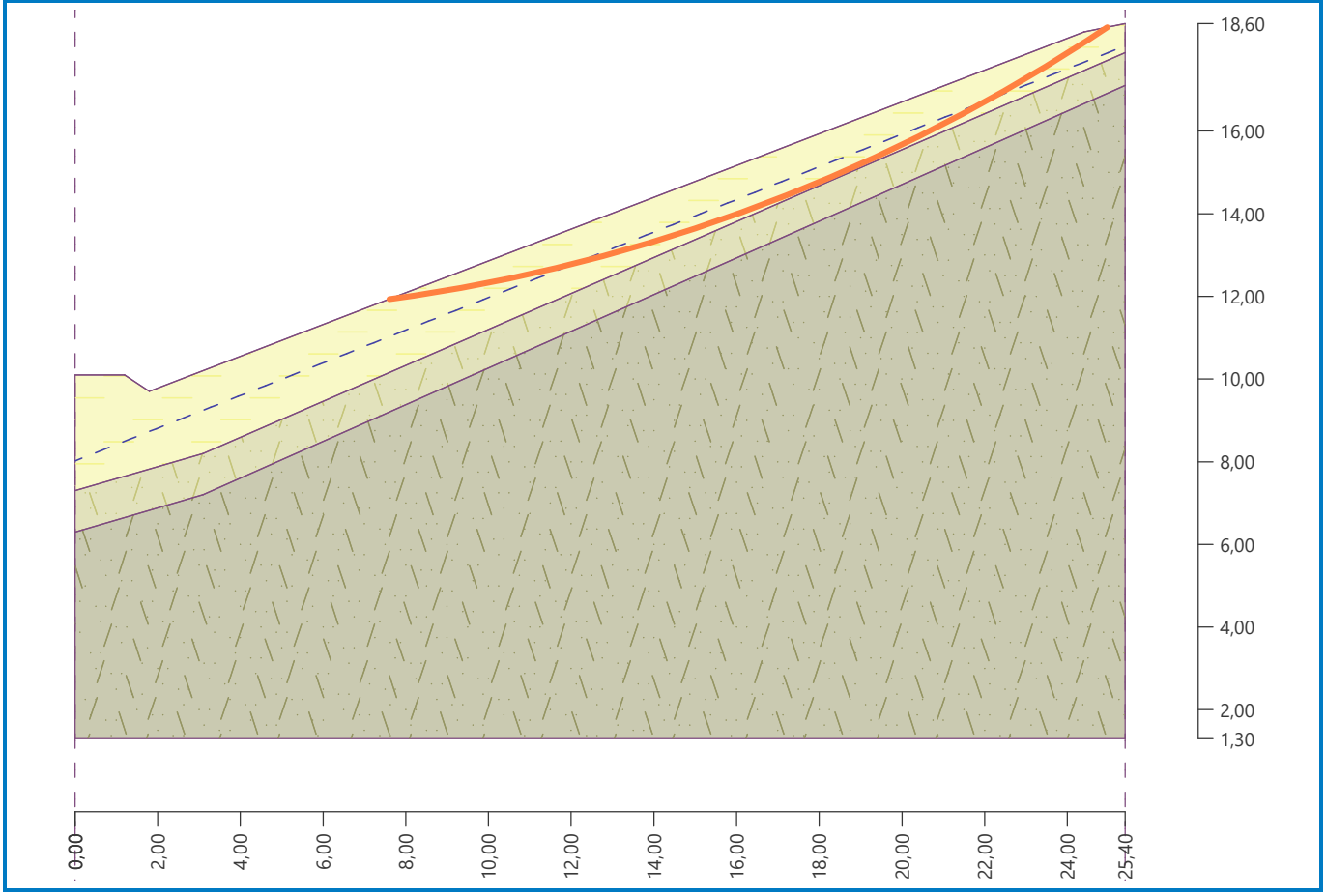
Slip surface parameters							
Center :	x =	2,03	[m]	Angles :	α_1 =	7,76	[°]
	z =	52,82	[m]		α_2 =	33,76	[°]
Radius :	R =	41,27	[m]				
Analysis of the slip surface without optimization.							

Slope stability verification (Bishop)

Sum of active forces : F_a = 93,44 kN/m
Sum of passive forces : F_p = 96,72 kN/m

Sliding moment : M_a = 3855,68 kNm/m
Resisting moment : M_p = 3991,12 kNm/m
Factor of safety = 1,04 < 1,50
Slope stability NOT ACCEPTABLE

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



Analysis 3

Circular slip surface

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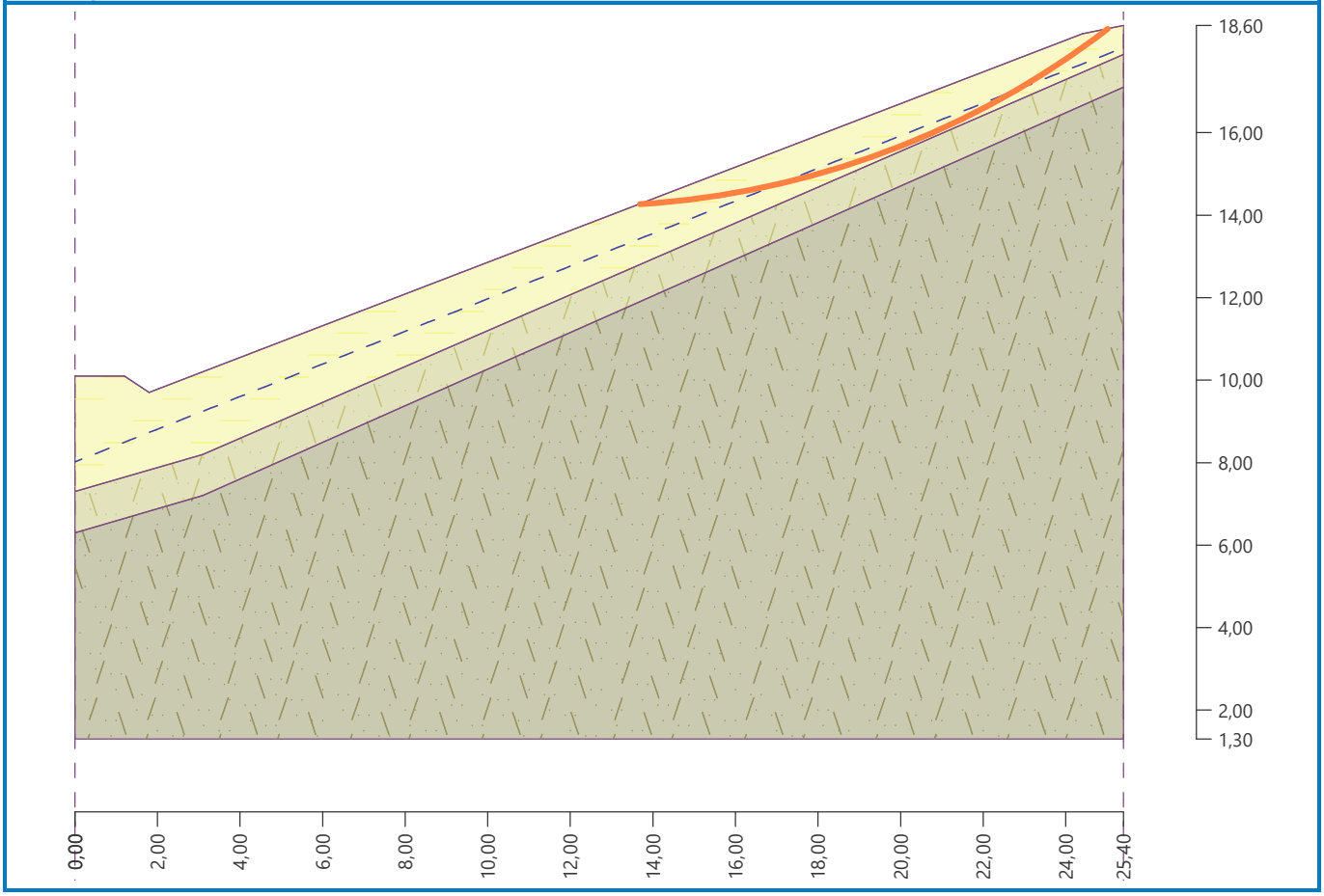
Slip surface parameters							
Center :	x =	12,38	[m]	Angles :	α_1 =	3,60	[°]
	z =	35,00	[m]		α_2 =	37,49	[°]
Radius :	R =	20,77	[m]				
Analysis of the slip surface without optimization.							

Slope stability verification (Bishop)

Sum of active forces : F_a = 52,12 kN/m
Sum of passive forces : F_p = 58,27 kN/m

Sliding moment : M_a = 1082,44 kNm/m
Resisting moment : M_p = 1210,14 kNm/m
Factor of safety = 1,12 < 1,50
Slope stability NOT ACCEPTABLE

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



Analysis 4

Circular slip surface

Slip surface parameters							
Center :	x =	-0,09	[m]	Angles :	α_1 =	3,16	[°]
	z =	49,43	[m]		α_2 =	38,70	[°]
Radius :	R =	39,68	[m]				
Analysis of the slip surface without optimization.							

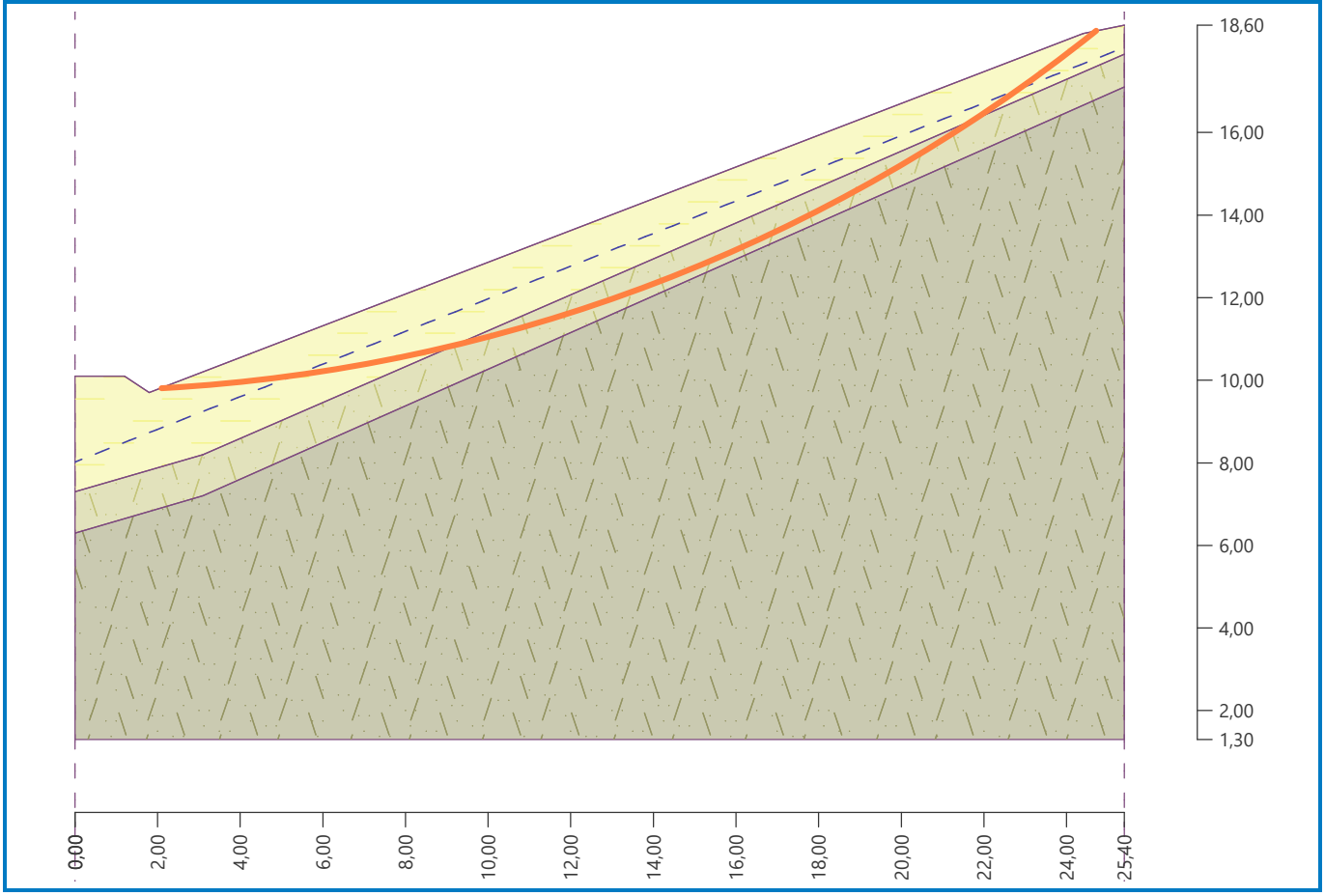
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Slope stability verification (Bishop)

Sum of active forces : F_a = 211,28 kN/m
Sum of passive forces : F_p = 364,31 kN/m

Sliding moment : M_a = 8383,61 kNm/m
Resisting moment : M_p = 14455,97 kNm/m
Factor of safety = 1,72 > 1,50
Slope stability ACCEPTABLE

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



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