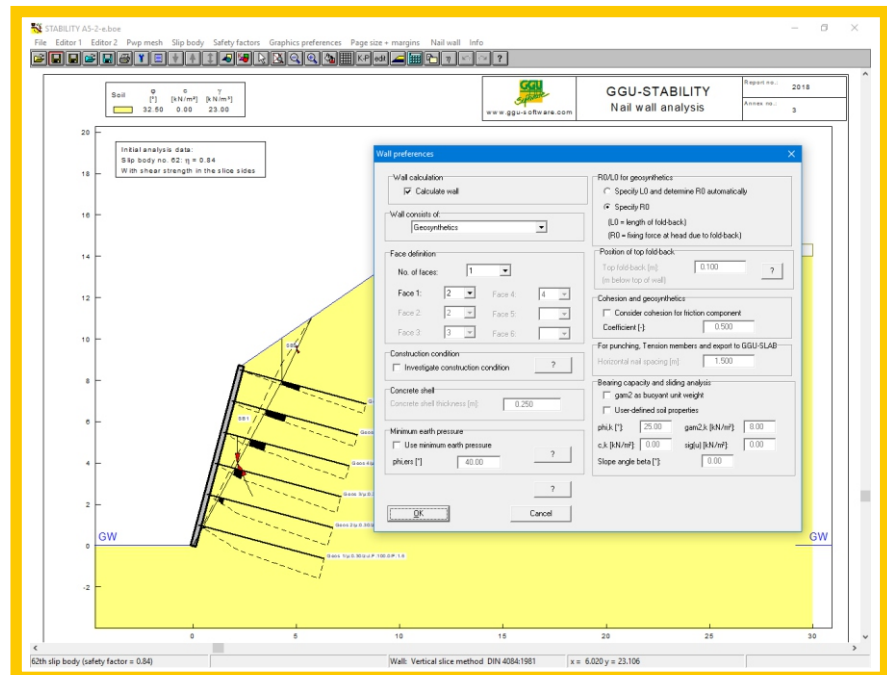
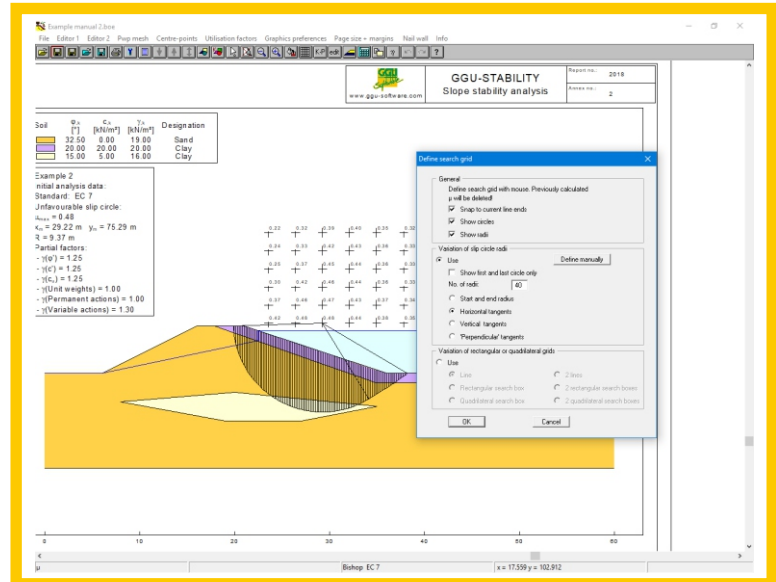


## Description

**GGU-STABILITY** – Slope stability analysis and analysis of soil nailing and reinforced soil walls.

### Capabilities:

- Slope and general stability to DIN 4084 and Ec7
- Analysis after Bishop, Janbu, using the general wedge or vertical slice method
- Choice of analysis using either partial safety factors to DIN 1054:2010, EC 7, Austrian Standard ÖNORM EN 1997-1 or global safety factors (DIN 1054 old)
- Consideration of vibrodisplacement compaction after Priebe
- Stabilisation columns after Neidhart/Gömmel
- System input using absolute heights
- Graphics oriented and tabular input/editing of system geometry and system data
- Import of surface points, pore water pressure points and soil layers from tables (e.g. Excel) via Windows clipboard
- Soil properties can be selected from an expandable database of common soils
- Active and passive earth pressure calculation after Culmann is possible
- Consideration of horizontal and vertical seismic acceleration
- Consideration of pore water pressures from a pore water pressure line or mesh
- Import of a pore water pressure mesh created in the GGU-2D-SSFLOW program (groundwater flow modelling)
- Nailing consisting of geosynthetics (reinforced soil wall) or tension members (modelling of anchors and soil nails)
- Automatic generation of nail grids or manual input
- Geosynthetics can be defined using company products
- Verification of sliding and overturning safety for nail wall
- Verification of bearing capacity failure safety to DIN 4017
- Bending design of the concrete shell to EC 2 via interface to the GGU-SLAB program
- Punching verification
- Determination of the maximal 'nail forces'
- Analysis with fibre cohesion for wastes dissimilar to soil (Kölsch method)
- Variable visualisation of safety factors, e.g. as colour-filled contours



- Adopted standard, program name and version can be included in the General legend
- User-defined design of output sheet
- Print or copy screen sections, e.g. for transfer to a word processor
- Integrated Mini-CAD system for additional annotation of graphics

Report no.: 2018

Annex no.: 1

GGU-STABILITY  
Nail wall analysis

www.ggu-software.com

# Section 1a - 1a

Nailed concrete shell next to built-up area

Initial analysis data:

Standard: EC 7

Partial factors:

-  $\gamma(\phi') = 1.25$

-  $\gamma(c) = 1.60$

-  $\gamma(c_{u1}) = 1.40$

-  $\gamma(\text{Unit weights}) = 1.00$

-  $\gamma(\text{Permanent actions}) = 1.00$

-  $\gamma(\text{Variable actions}) = 1.30$

Tension members:

Horizontal spacing [m] = 1.500

Slip body no. 30:  $\mu = 1.25$

## Tension members

Nr.	Depth [m]	L [m]	D [m]	FL [m]	E <sub>sd</sub> [kN]	$\eta_1$	SB no.	max E <sub>s</sub> [kN]	R <sub>k</sub> [kN]	F <sub>ic</sub> Slice
4	6.00	6.00	0.10	0.00	6.46	0.97	41	6.46	150.00	Yes
3	4.50	6.00	0.10	0.00	7.27	0.97	41	7.27	150.00	Yes
2	3.00	6.00	0.10	0.00	8.31	0.88	33	8.31	150.00	Yes
1	1.50	6.00	0.10	0.00	9.50	0.88	33	9.50	150.00	Yes

E<sub>sd</sub> = Earth pressure on outer skin  
E<sub>sd</sub> = force from failure mechanism (divided by  $\eta_1 = 1/\mu$ )  
Horizontal nail spacing = 1.500 m

## Nail wall legend

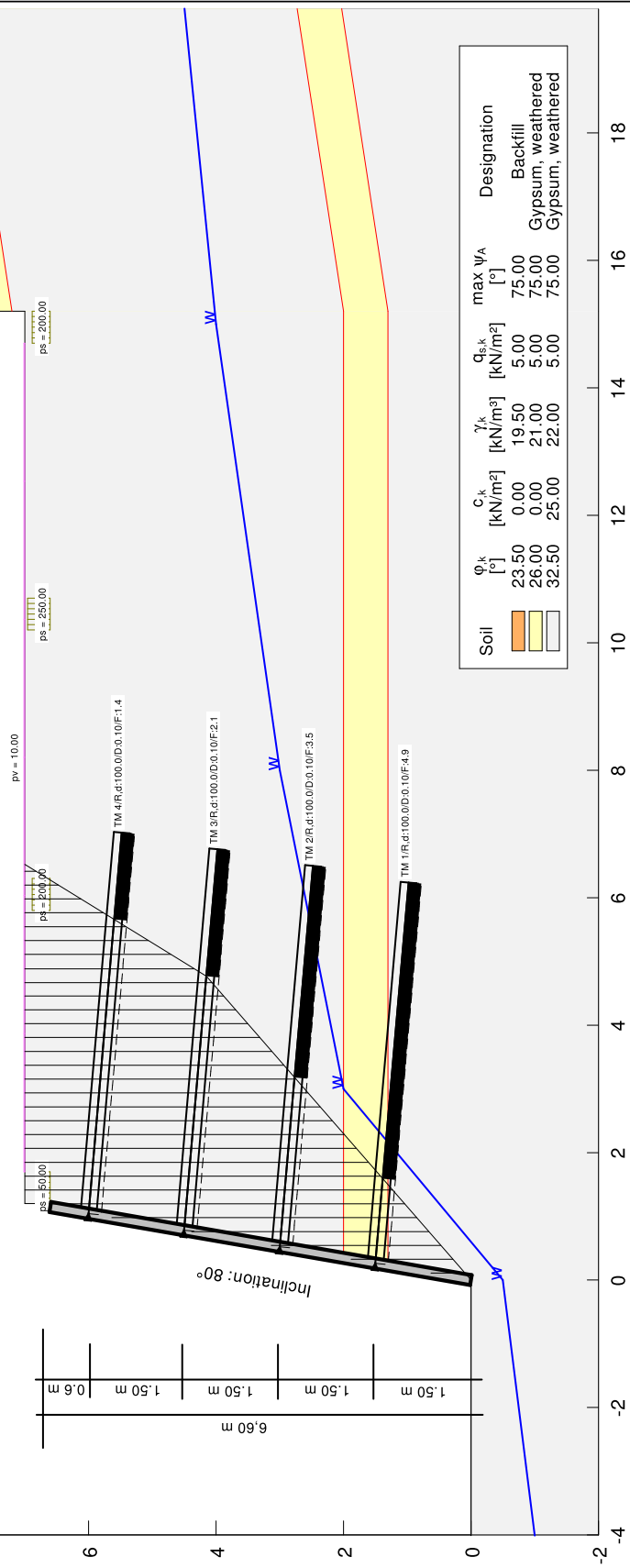
### DIMENSIONS

Bottom:  $x = 0.000$   $y = 0.000$  m

Length = 6.699 m Concrete shell inclination = 80.15 °

Concrete shell thickness = 0.160 m

Horizontal nail spacing = 1.500 m



Soil	$\phi_k$ [°]	$c_k$ [kN/m <sup>2</sup> ]	$\gamma_k$ [kN/m <sup>3</sup> ]	$q_{s,k}$ [kN/m <sup>2</sup> ]	max $\psi_A$ [°]	Designation
Backfill	23.50	0.00	19.50	5.00	75.00	Backfill
Gypsum, weathered	26.00	0.00	21.00	5.00	75.00	Gypsum, weathered
Gypsum, weathered	32.50	25.00	22.00	5.00	75.00	Gypsum, weathered