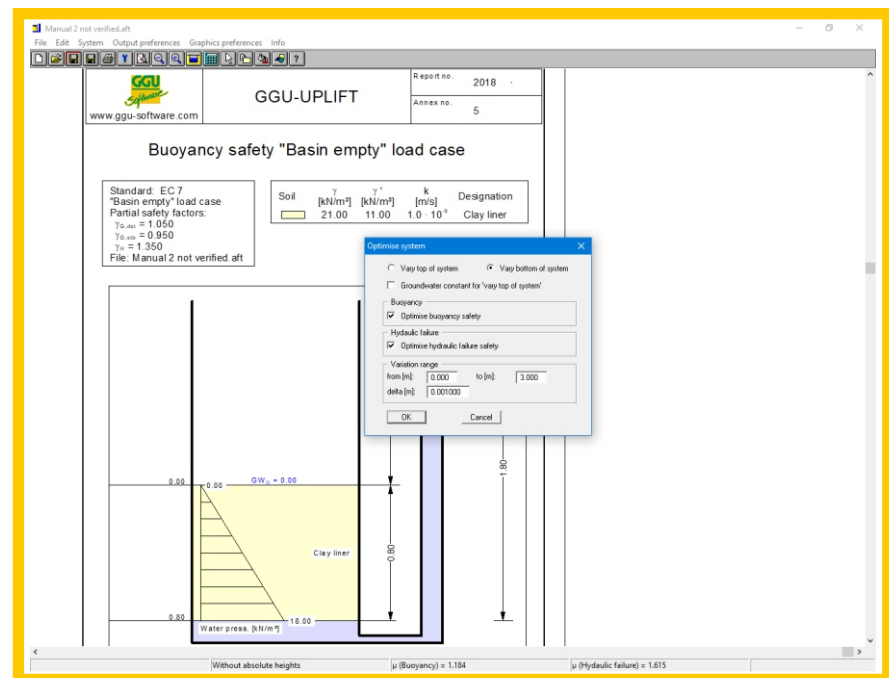
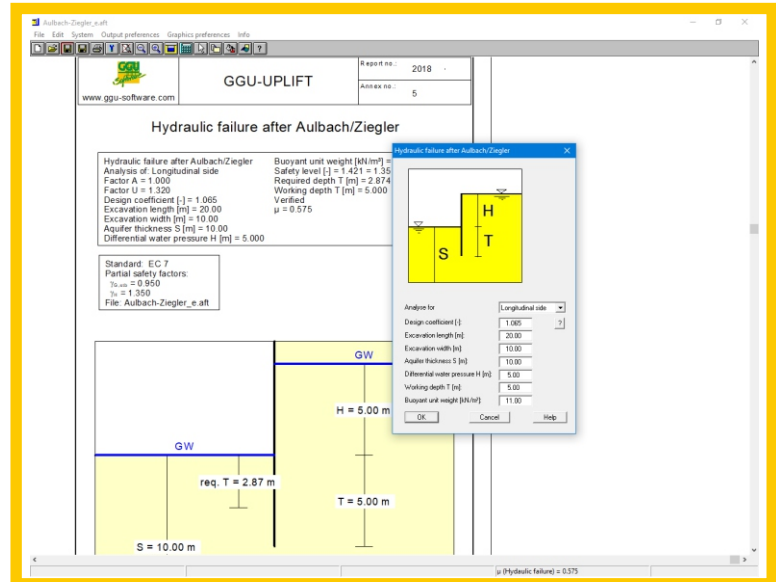


Description

GGU-UPLIFT – Analysis of buoyancy safety and hydraulic failure safety.

Capabilities:

- Analysis using either the global safety factor concept (DIN 4126) or the partial safety factor concept (DIN 4126-100 and EC 7/DIN 4126:2013)
- Determination of buoyancy safety
- Determination of hydraulic failure safety 'classical' or after Aulbach/Ziegler
- System optimisation (e.g. thickness of a liner layer) in terms of demanded safety factors
- System input and visualisation using absolute heights
- Input of any soil strata configuration
- Soil properties can be selected from an expandable database of common soils
- Graphical system presentation using either pore water pressure distribution, potential course or gradient visualisation
- Adopted standards and partial factors can be included in the General legend
- Program name and version can be included in the General legend
- Variable, user-designed output sheet
- 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





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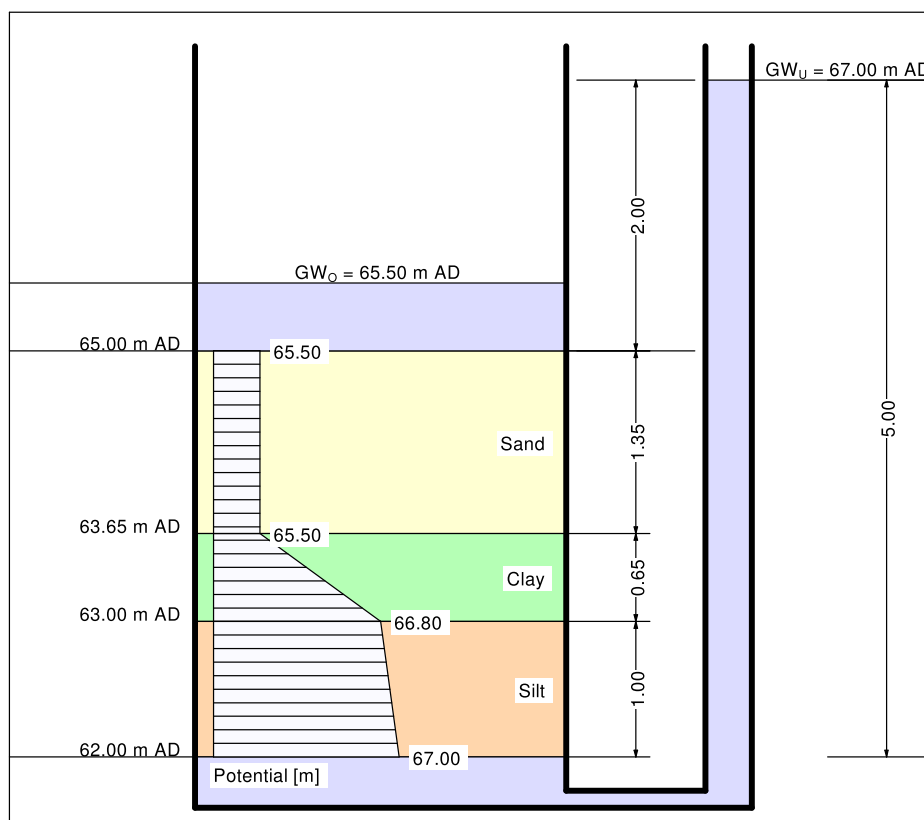
Annex no. 5

Buoyancy safety and hydraulic failure safety

Standard: EC 7
Manual example 1
Partial safety factors:
 $\gamma_{G,dst} = 1.050$
 $\gamma_{G,stb} = 0.950$
 $\gamma_H = 1.450$
File: Manual 1-e.aft

Soil	Depth [m AD]	γ [kN/m ³]	γ' [kN/m ³]	k [m/s]	Designation
	63.65	19.00	10.00	$1.0 \cdot 10^{-4}$	Sand
	63.00	20.00	11.00	$1.0 \cdot 10^{-8}$	Clay
	<63.00	19.00	10.00	$1.0 \cdot 10^{-7}$	Silt

Ground level = 65.00 m AD



Buoyancy safety
Utilisation factor $\mu = 0.920$
Depth = 63.000 m AD
Weight = 45.650 kN/m²
 $\gamma_{G,stb} = \gamma$ (Weight) = 0.950
PW press. = 38.000 kN/m²
 $\gamma_{G,dst} = \gamma$ (PW press.) = 1.050
 $\mu = 1.050 \cdot 38.000 / (0.950 \cdot 45.650)$

Hydraulic failure safety
Utilisation factor $\mu = 0.961$
Depth = 63.000 m AD
Weight = 20.650 kN/m²
 $\gamma_{G,stb} = \gamma$ (Weight) = 0.950
Flow force = 13.000 kN/m²
 $\gamma_H = \gamma$ (Flow force) = 1.450
 $\mu = 1.450 \cdot 13.000 / (0.950 \cdot 20.650)$