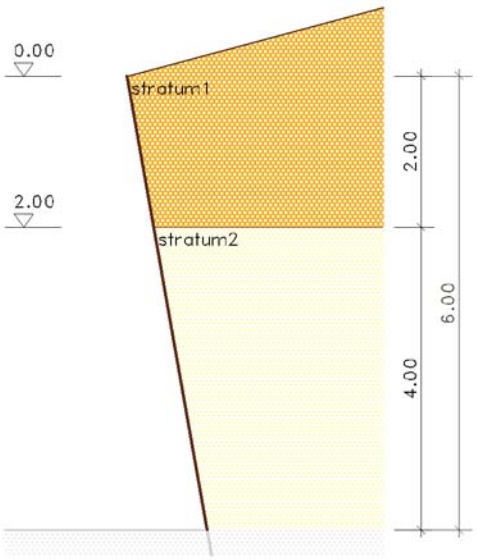
calculation of earth pressures

According to DIN 4084:2017-08 and associated standard specifications

calculation of the active earth pressure

1. system

scale 1:100



wall inclination
contact surface inclined to the earth structure with α = 10.00°

wall friction
for a **rough** wall surface,
angle of wall friction $\delta = 2/3 \cdot \varphi'_k$

Oberfläche
slope with constant rise of β = 15.00°

soil strata

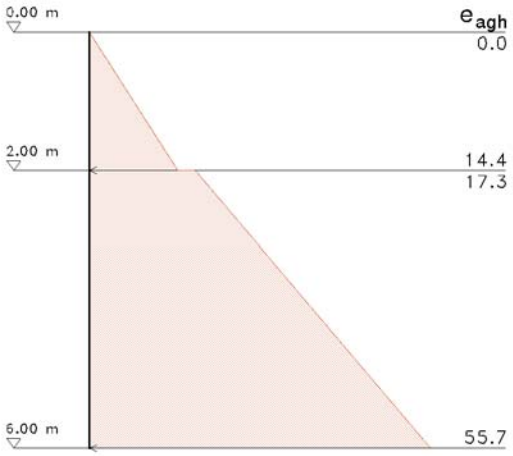
stratum	notation	soil type	d m	γ kN/m³	γ' kN/m³	φ' °	c' kN/m²
1	stratum1	non-cohesive	2.00	18.00	8.00	35.00	---
2	stratum2	non-cohesive	---	20.00	8.00	30.00	---

d - stratum thickness γ - unit weight of soil γ' - unit weight of submerged soil φ' - angle of internal friction of drained soil
c' - cohesion of the drained soil

2. active earth pressure

2.1. from dead load of the soil

e_{agh} horiz. earth pressure due to soil weight



soil

$\Sigma(\gamma \cdot h)$ total soil weight at the depth considered
K_{agh} coefficient of earth pressure acc. to [1] section 6.02.3, eqn.(6.02)
e_{ah}/e_{av} horiz. and vertical ordinate of earth pressure
e_{ares} res. ordinate of earth pressure from horizontal and vertical proportion

z m	$\Sigma(\gamma \cdot h)$ kN/m²	K_{agh} -	e_{ah} kN/m²	e_{av} kN/m²	e_{ares} kN/m²
0.00	0.00	0.400	0.00	0.00	0.00
2.00	36.00	0.400	14.41	9.48	17.25
2.00	36.00	0.480	17.29	9.98	19.97
6.00	116.00	0.480	55.72	32.17	64.34

horizontal component of the earth pressure force E_h= 160.44 kN/m
vertical component of the earth pressure force E_V= 93.79 kN/m
earth pressure force E = 185.84 kN/m
point of application of the earth pressure force z_E= 4.08 m

3. summary

kind of earth pressure	earth pressure force			
	E_h kN/m	E_v kN/m	E kN/m	z_E m
soil	**160.44**	93.79	185.84	4.08

literature and standard specifications:
[1] Dörken/Dehne/Kliesch: Grundbau in Beispielen, Teil 1, Werner Verlag, 5.Aufl., 2013