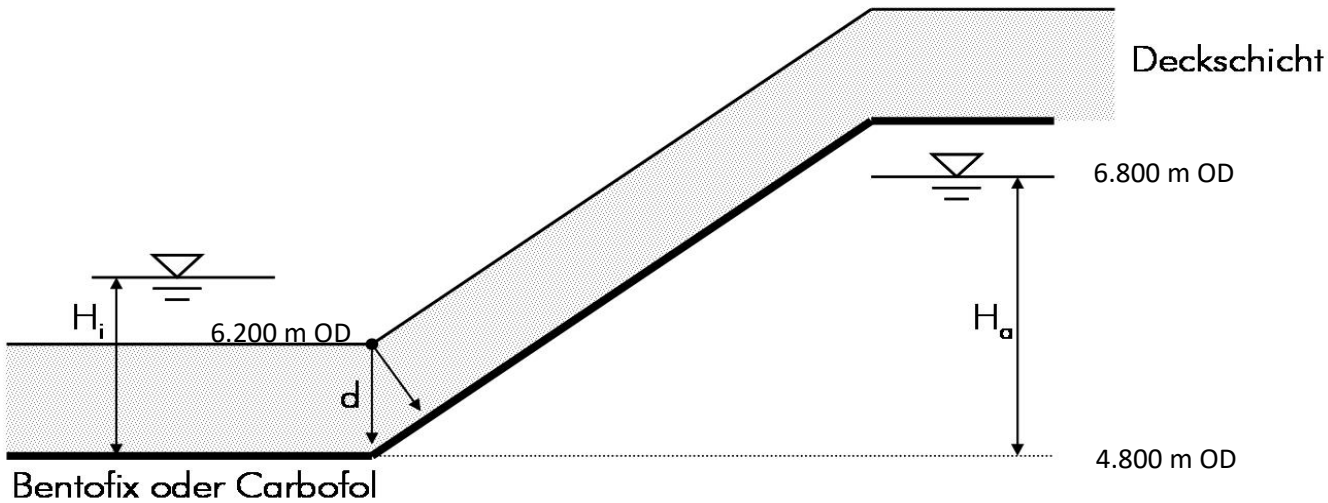
Buoynacy of the sealing system

Calculation of the required cover soil layer thickness on top of the planned sealing system to prevent buoyancy.

Input value



Water level in the pond above the sealing system:	H_i =	0,00	m	(Wasserstand innerhalb Dichtung)
Groundwater level above the sealing system:	H_a =	2,00	m	(Wasserstand außerhalb Dichtung)
Unit weight of water:	γ_W =	10,00	kN/m³	
Unit weight of the soil layer above the sealing s	γ_B =	16,00	kN/m³	(gemischtkörniger Oberboden)
Partial safety factor (favorable, permenant load	$\gamma_{G,stb}$ =	0,95	[-]	
Partial safety factur (unfavourable, permanent l	$\gamma_{G,dst}$ =	1,05	[-]	

Bouynacy force σ_A below the sealing system:

$\sigma_{A,d} = H_a * \gamma_W * \gamma_{G,dst}$

Load σ_G above the sealing system:

$\sigma_{G,d} = (d * \gamma_B + H_i * \gamma_W) * \gamma_{G,stb}$

(The load from any existing water level HW in the pond is neglected on the safe side, if the minimum water level can not be permanently ensured.)

Safety against bouynacy (dregee of untilisation):

$\mu = \sigma_{A,d} / \sigma_{G,d} \leq 1,0$

Required cover soil layer thickness d above the sealing system:

$\mu = \sigma_{A,d} / \sigma_{G,d} \leq 1,0$
$\sigma_{G,d} \geq \sigma_{A,d}$
$d \geq (\gamma_{G,dst} / \gamma_{G,stb}) * (H_a * \gamma_W) / (\gamma_B - H_i * \gamma_W)$

required cover soil layer thickness d: $d \geq$ 1,3816 m

Result:

The required coverage of the sealing system d to protect against buoyancy and the required cover soil layer thickness is mind. 1,38 m.