

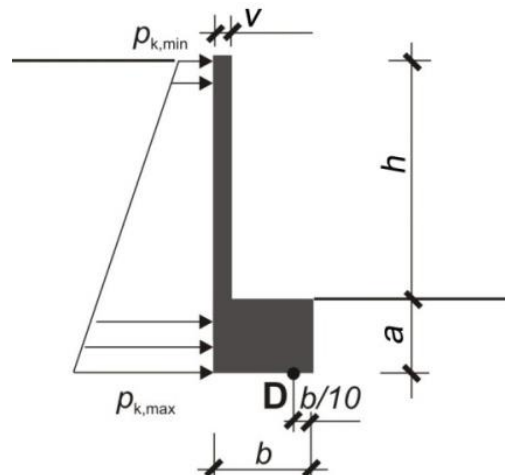
## Safety factors, turnover

1. The figure shows a reinforced concrete dam. A trapezoid shaped earth pressure is acting on it according to the figure.

Check if the dam is safe against turnover!

Data:  $a=0,8$  m,  $b=1,5$  m,  $h=3,5$  m,  $v=0,6$  m,  $p_{k,min}=0,8$  kN/m<sup>2</sup>,  $p_{k,max}=7$  kN/m<sup>2</sup>. The density of the reinforced concrete is 24 kN/m<sup>3</sup>. The safety factor of the dead load is:  $\gamma_G=0,9$  or 1,35. The safety factor of the earth pressure is  $\gamma=1,4$ .

Remark: We ignore the supporting effect of the soil on the right. The centre of rotation is point "D". Consider a one meter long part of the dam!



2. The figure shows the mechanical model of a timber beam.

a) Which load scheme should we use if we want to determine the maximal support reaction in the *pin joint* support? Calculate this maximal support reaction!

b) Which load scheme should we use if we want to determine the maximal support reaction in the *roller* support? Calculate this maximal support reaction!

c) Is it possible that the beam lifts off from the pin joint support if we do not tie them together?

Data:  $x_1= 4,00$  m,  $x_2= 2,00$  m,  $t=1,20$  m,  $g_k= 1,50$  kN/m,  $q_k= 4,00$  kN/m.

Safety factors: dead load:  $\gamma_G=0.9$  or 1,35, live load:  $\gamma_G=0,9$  or 1,35.

Remark: In the case of the dead loads the same safety factor should be used for the whole beam in a given load scheme.

