

HOMEWORK 3

Due on: 25 October 2016 Tuesday at 23:59.

(submit digitally 1 file via ODTUClass, or submit printed copy to Nejan Huvaj's office)

- 1) (4 points) A half-closed clay layer is 8 m thick and it can be assumed that horizontal and vertical coefficient of consolidation are equal, $c_v=c_h$. Vertical sand drains 300 mm in diameter, spaced at 3 m in a square pattern, are to be used to increase the rate of consolidation of the clay under the increased vertical stress due to the construction of an embankment. Without sand drains, the degree of consolidation at the time the embankment is due to come into use has been calculated as 25%. What degree of consolidation would be reached with the sand drains at the same time?

- 2) (6 points) A foundation for a tank is to be constructed on a 20 m thick soft deposit of clay. Below the soft clay is a sandy gravel. The calculated primary consolidation settlement cannot be tolerated and it was decided that the soil should be preconsolidated by a wide embankment that produces the same final settlement as the tank. The data available are: $c_v = 6 \text{ m}^2/\text{yr}$, $c_h = 10 \text{ m}^2/\text{yr}$, $m_v = 0.2 \text{ m}^2/\text{MN}$. The foundation of the tank is circular, its diameter is 10 m, it will be placed at the ground surface and it will apply 200 kPa pressure. Do not subdivide the clay and use 2V:1H stress distribution. The width of prefabricated vertical drain to be used is 110 mm and its thickness is 7 mm. Determine the spacing of a square grid of the PVD drains to achieve 18 cm settlement in 4 months.