

1. Calculate the (gross) foundation pressure and the net foundation pressure.
2. Calculate the long term settlement of this building. Assume the construction period is small compared to the consolidation time scale (*means that the quick removal of soil and reapplication of the same weight won't cause settlement; therefore the initial stresses are the stresses before the excavation, and the stress increase will be due to the net foundation pressure*). Assume  $30^\circ$  stress dissipation trapezoid. Divide each Clay into 2 sublayers. (*Hint: making an Excel worksheet for this question will help you solve question 8.*)
3. Calculate the coefficient of subgrade reaction for this foundation.
4. Assuming the bearing failure occurs in only Clay 1, calculate the ultimate bearing capacity of this foundation, for both short and long term. Which case is more critical regarding bearing failure?
5. Calculate the net ultimate bearing capacity of this foundation, for short term.
6. Calculate the net safe bearing capacity of this foundation, for short term, with a safety factor of 2.
7. Calculate the safe bearing capacity of this foundation, for short term.
8. Allowable settlement is 10 cm. Calculate the gross foundation pressure that would cause this settlement.
9. Determine the allowable (gross) bearing capacity of this foundation. Compare with the answer to question 1.