



CAIRO UNIVERSITY
FACULTY OF ENGINEERING
Soil Mechanics and Foundations Engineering Division

FOUNDATIONS

4th Year Civil

EXERCISE (7)

2016-2017

SHEET PILE WALLS

- 1) a- Mention using sketches (whenever possible) four cases in which sheet pile walls are used.
b- Make a complete design of the cantilever sheet pile wall shown in Figure (1).
- 2) a- What are the different materials used in sheet pile walls? What are the advantages of steel sheet piles over the other materials?
b- For the sheet pile wall shown in Figure (2), find the penetration depth of the sheet pile so that the backfill can be temporarily retained behind it.
- 3) a- Describe using clear sketches the possible modes of failure of anchored sheet pile wall.
b- Design the sheet pile wall shown in Figure (3) considering free earth support condition.
- 4) a- Sketch the elastic lines and the bending moment diagrams for the various types of sheet pile walls.
b- Redesign the sheet pile wall shown in Figure (3) considering fixed earth support condition.

Comment on the differences between the two cases with regard to:

- i- Penetration depth.
- ii- Maximum bending moment in the sheet pile wall.
- iii- Force in tie rod.

iv- Length of tie rod.

5) Find the forces in the struts for the strutted excavation shown in Figure (4) for the following cases (Spacing = 3.0m):

i. Loose Sand ($\phi = 32^\circ$, $\gamma = 1.8 \text{ t/m}^3$).

ii. Clay (Unconfined compressive strength = 5.0 t/m^2 , $\gamma = 1.9 \text{ t/m}^3$).

For case (ii), check the stability of the strutted excavation due to bottom heave.

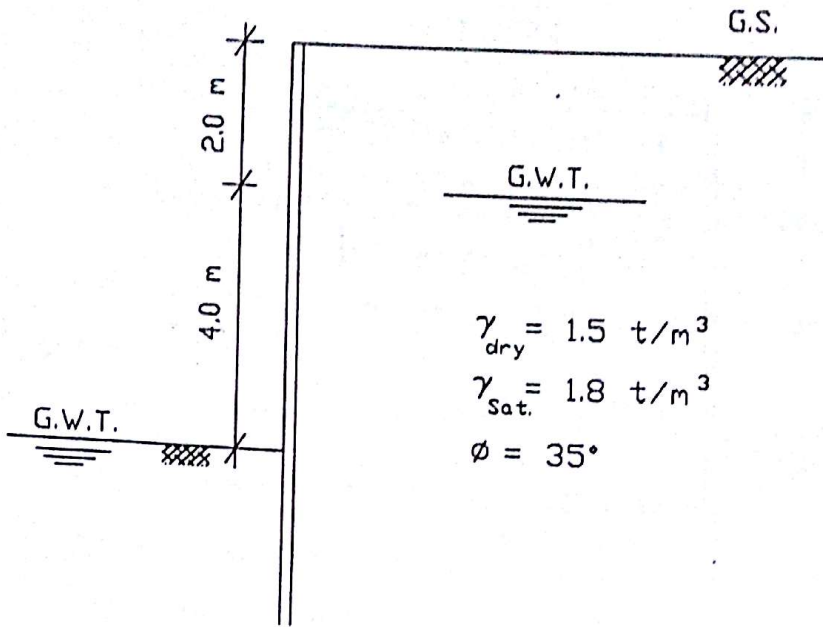


Figure (1)

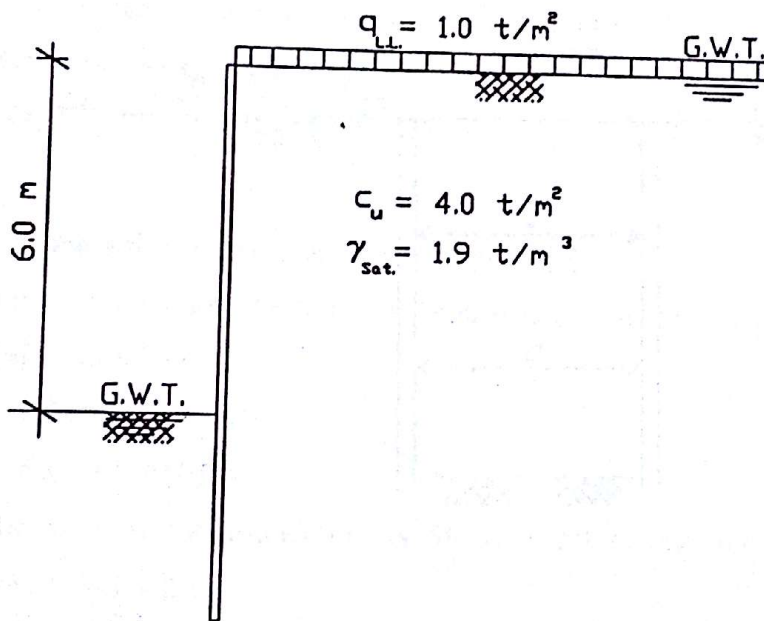


Figure (2)

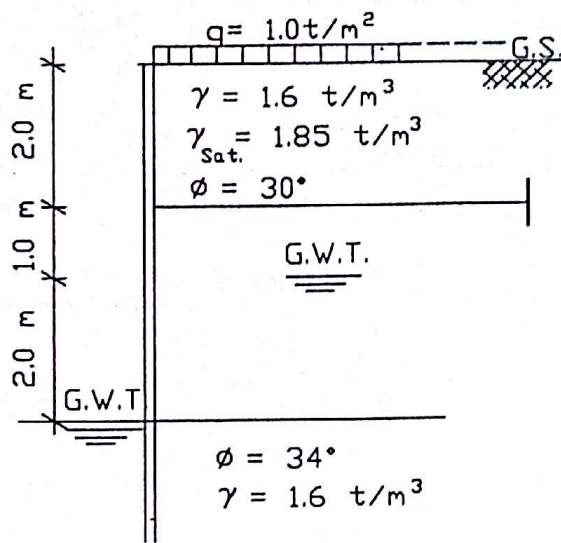


Figure (3)

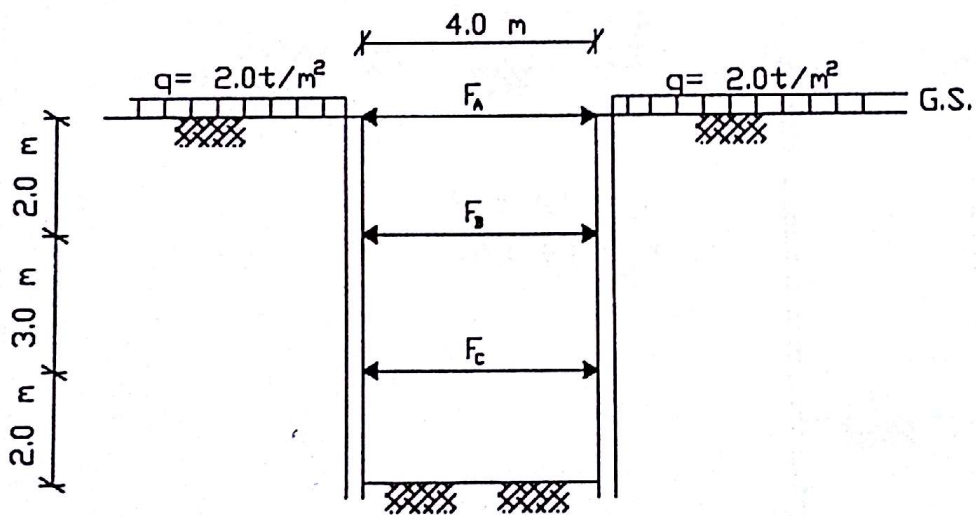


Figure (4)