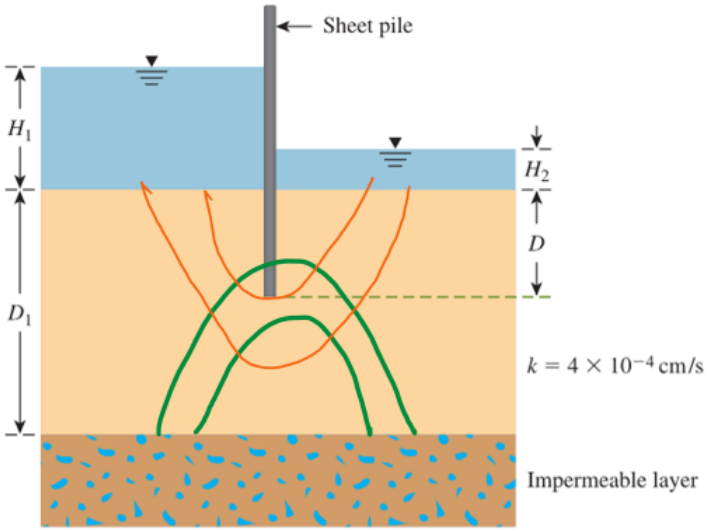
Question 8.2

Below is the flow net (noted by the orange lines) for seepage around a single row a sheet piles.

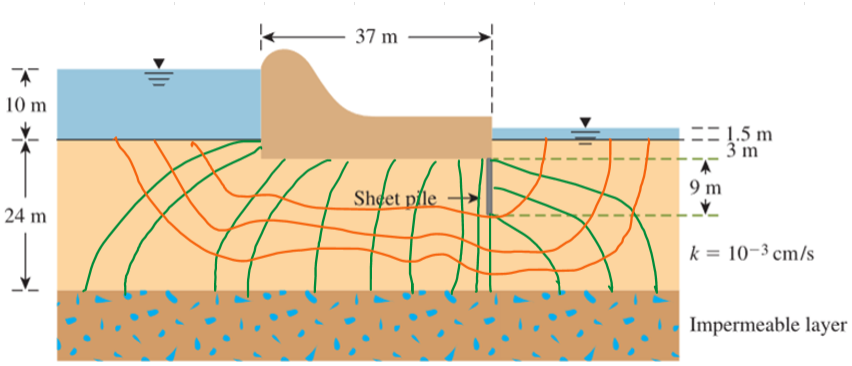


The seepage loss per meter length of the sheet pile is calculated as follows, with N_f being 3, N_d being 6, H_2 being 3 m, H_1 being 0.5 m and k being as defined.

$$q = k \times \frac{(H_2 - H_1) \times N_f}{N_d} = \boxed{5 \times 10^{-6} \text{ m}^3/\text{s/m}}$$

Question 8.6

Below is the flow net (noted by the orange lines).



The seepage loss per meter length of the sheet pile is calculated as follows, with N_f being 4, N_d being 14, H_2 being 10 m, H_1 being 1.5 m and k being as defined.

$$q = k \times \frac{(H_2 - H_1) \times N_f}{N_d} = \boxed{2.4 \times 10^{-5} \text{ m}^3/\text{s/m}}$$

Question 8.8

First determine Δ using α_1:

$$\Delta = \frac{H}{\tan \alpha_1} = \frac{7 \text{ m}}{\tan 35^\circ} = 10 \text{ m}$$

Now determine d:

$$d = H_1 \cot \alpha_2 + L_1 + (H_1 - H) \cot \alpha_1 + 0.3\Delta = 24.2 \text{ m}$$

Now determine L:

$$L = \frac{d}{\cos \alpha_2} - \sqrt{\frac{d^2}{\cos^2 \alpha_2} - \frac{H^2}{\sin^2 \alpha_2}} = 1.94 \text{ m}$$

Lastly, determine the seepage rate:

$$q = kL \tan \alpha_2 \sin \alpha_2 = 3.13 \times 10^{-6} \text{ m}^3/\text{s/m} = \boxed{0.271 \text{ m}^3/\text{day/m}}$$

Question 8.9

Using d from 8.8, d/H must be calculated.

$$\frac{d}{H} = 3.46 \text{ m}$$

Eyeballing Figure 8.17, m is 0.25. Now calculate L:

$$L = \frac{m \times H}{\sin \alpha_2} = 2.72 \text{ m}$$

Now use the following equation for seepage:

$$q = kL \sin^2 \alpha_2 = 3.37 \times 10^{-6} \text{ m}^3/\text{sec/m} = \boxed{0.292 \text{ m}^3/\text{sec/m}}$$