

ateb Consult

Job No:

Contract:

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Gabion Wall Allhues

Design Check

February 2021.

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Gabin Wall
Des-m

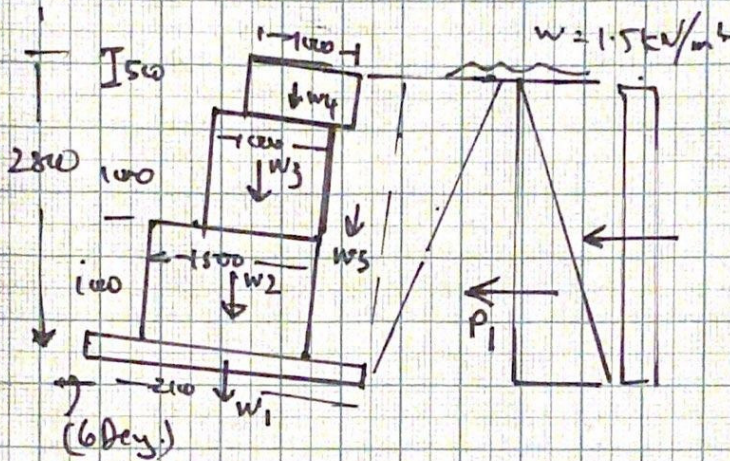
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Sep 1
95



Wall Mass:-

$$W_1 = 0.3 \times 2.1 \times 25 = 15.75 \text{ KN}$$

$$W_2 = 1.5 \times 1.0 \times 18 = 27$$

$$W_3 = 1.0 \times 1.0 \times 18 = 18$$

$$W_4 = 0.5 \times 1.0 \times 18 = 9$$

$$W_5 = 1.8 \times 2 \times 0.3 = 10.8$$

$$\sum W = 80.55 \text{ KN}$$

Hyd Forces

$$P_1 = 0.271 \times 18 \times 2.8^2 / 2 = 19.12 \text{ KN}$$

$$P_2 = 0.271 \times 1.5 \times 2.8 = 1.138 \text{ KN}$$

$$\sum P = 20.258 \text{ KN}$$

Soil
Parameters

$$\gamma = 18 \text{ KN/m}^3$$

$$\phi = 35^\circ$$

$$c = 0$$

$$K_a = 0.271$$

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Wall Stability

Sliding. :- Wall inclined at 6°
(ignore passive pressure)

$$P_H = 20.258 \cos 6^\circ = 20.147$$

$$P_V = 20.258 \sin 6^\circ = 2.11 \text{ kN}$$

$$W = 80.55 \text{ kN}$$

$$\mu = 0.43$$

$$\text{ult FS} = \frac{(80.55 + 2.11) \times 0.43}{20.147}$$

$$= 1.76 > 1.75^* \text{ Satisfy}$$

∴ (* radial FS > as also passive pressure
to front of wall)

Wall Overturning

Resolve Moments about Toe

$$\text{O/T Moment} = \frac{P_A + P_S}{2} \times 2.8/3 + 1.138 \times 2.8/2 = 19.43 \text{ kNm}$$

Resisting Moment at Toe :-

$$\text{Wall weight St} = \frac{15.75 \times 2.1}{2} + 27 \times 1.05 + 18 \times 1.3 + 9 \times 1.5 + 10.8 \times 1.4$$

$$= 81 \text{ kNm}$$

$$F/S = 81/19.43 = 4.2 - \text{Satisfy}$$

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Wall Stability

Sliding: $\therefore$ Wall inclined at 6°
(ignore passive pressure)

$$P_H = 20.258 \cos 6^\circ = 20.147$$

$$P_V = 20.258 \sin 6^\circ = 2.11 \text{ kN}$$

$$W = 80.55 \text{ kN}$$

$$e = 0.43$$

$$\text{gr FS} = \frac{(80.55 + 2.11) \times 0.43}{20.147}$$

$$= 1.76 > 1.75^* \text{ Satisfy}$$

$\therefore$ (*radial FS > as also passive pressure to front of wall)

Wall Overturning

Resolve Moments about Toe

$$\text{O/T Moment} = \frac{P_A + P_S}{2} \times 2.8/3 + 1.138 \times 2.8/2 = 19.43 \text{ kNm}$$

Resisting Moment at Toe:

$$\text{Wall weight SD} = \frac{15.75 \times 2.1}{2} + 27 \times 1.05 + 18 \times 1.3 + 9 \times 1.5 + 10.8 \times 1.9 = 81 \text{ kNm}$$

$$F/S = 81/19.43 = 4.2 - \text{Satisfy}$$

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Summary Details

Wall Safety - Sliding & Overturning

FS Sliding = 1.76

FS O/T = 4.2

Gwyn
MSc MICE

16/2/21