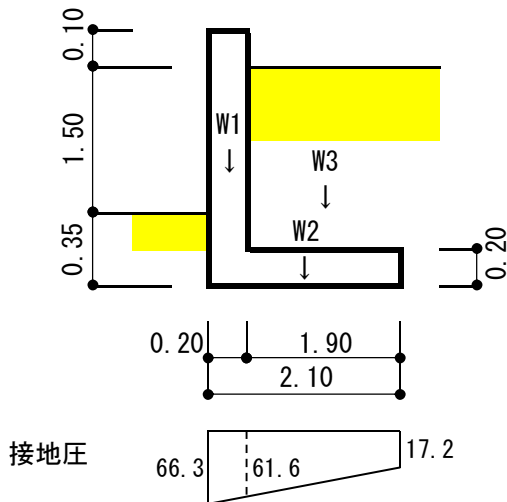


【L型擁壁の設計】



a) 設計条件
 上載荷重 10.0 kN/m² フェンス 0.00 kN/m

b) 地盤条件
 土の比重 16.0 kN/m³ 土圧係数 0.50
 摩擦係数 0.40
 地耐力 80.0 kN/m²

c) 各部の重量
 $W1 = 24.0 \times 0.20 \times 1.75 = 8.40 \text{ kN}$
 $W2 = 24.0 \times 0.20 \times 2.10 = 10.08 \text{ kN}$
 $W3 = (16.0 \times 1.65 + 10.0) \times 1.90 = 69.16 \text{ kN}$
 $\Sigma W = 87.64 \text{ kN}$

d) 土圧荷重
 $PH = 0.50 \times 16.0 \times 1.85^2 / 2 = 13.69 \text{ kN} \dots \dots \text{土圧合力}$
 $PH' = 0.50 \times 10.0 \times 1.85 = 9.25 \text{ kN} \dots \dots \text{上載荷重合力}$

e) 安定計算
 $Mt = 13.69 \times 1.85 / 3 + 9.25 \times 1.85 / 2 = 17.00 \text{ kN}\cdot\text{m} \dots \dots \text{転倒モーメント}$
 $Mr = 8.40 \times 0.100 + 10.08 \times 1.050 + 69.16 \times 1.150 = 90.96 \text{ kN}\cdot\text{m} \dots \dots \text{抵抗モーメント}$

・ 接地圧の検討
 $e = 2.10 / 2 - (90.96 - 17.00) / 87.64 = 0.206 \text{ m}$
 $\sigma_{\max} = 87.64 / 2.10 \times (1 + 6 \times 0.206 / 2.10) = 66.3 \text{ kN/m}^2 < 80 \text{ kN/m}^2$
 $\sigma_{\min} = 87.64 / 2.10 \times (1 - 6 \times 0.206 / 2.10) = 17.2 \text{ kN/m}^2 > 0 \text{ kN/m}^2$
∴ OK

・ 転倒安全率の検討
 $90.96 / 17.00 = 5.35 > 1.5 \quad \therefore \text{OK}$

・ 滑動安全率の検討
 $0.40 \times 87.6 / (13.69 + 9.25) = 1.53 > 1.5 \quad \therefore \text{OK}$

f) 壁、底版の計算

・ 壁の断面算定
 $M = 0.50 \times 16.0 \times 1.65^3 / 6 + 0.50 \times 10.0 \times 1.65^2 / 2 = 12.80 \text{ kN}\cdot\text{m}$
 $Q = 0.50 \times 16.0 \times 1.65^2 / 2 + 0.50 \times 10.0 \times 1.65 = 19.14 \text{ kN}$
 $t = 20.0 \text{ cm} \quad dt = 7.0 \text{ cm} \quad j = 11.37 \text{ cm}$
 $at = 12.80 \times 100 / 19.14 / 11.37 = 5.78 \text{ cm}^2$
 $\rightarrow \text{D13@150} \quad (8.47 \text{ cm}^2) \quad \text{検定比} : 0.68 \quad \therefore \text{OK}$
 $\tau = 19.14 \times 1000 / 11.37 / 10000 = 0.17 < 0.70 \text{ N/cm}^2 \quad \therefore \text{OK}$
 OK

・ 底版の断面算定
 $M = 17.2 \times 1.90^2 / 2 + 44.4 \times 1.90^2 / 6 - 41.2 \times 1.90^2 / 2 = 16.60 \text{ kN}\cdot\text{m}$
 $Q = 17.2 \times 1.90 + 44.4 \times 1.90 / 2 - 41.2 \times 1.90 = 3.40 \text{ kN}$
 $t = 20.0 \text{ cm} \quad dt = 7.0 \text{ cm} \quad j = 11.37 \text{ cm}$
 $at = 16.60 \times 100 / 19.14 / 11.37 = 7.49 \text{ cm}^2$
 $\rightarrow \text{D13@150} \quad (8.47 \text{ cm}^2) \quad \text{検定比} : 0.88 \quad \therefore \text{OK}$
 $\tau = 3.40 \times 1000 / 11.37 / 10000 = 0.03 < 0.70 \text{ N/cm}^2 \quad \therefore \text{OK}$