

Design of Dirt Wall

Dirt wall is subjected to

- (1) Live load
- (2) Live load surcharge
- (3) Braking force
- (3) Earth Pressure

- 1) Consider 70 T tracked vehicle case is governing & 14 T Axle over dirt wall, Dispersion width at **top of DIRT WALL**

$$= 2.90 + (1.2 + 0.305) + 0.83$$

$$= 2.90 + 1.53 + 0.825$$

$$= 5.255 \text{ M}$$

$$\frac{\text{Live Load}}{\text{M Length}} = \frac{14}{5.255} = 2.66 \text{ T/M}$$

- 2) Self wt. of dirt wall

$$= 0.6 \times 0.3 \times 2.4$$

$$= 0.495 \text{ T/M}$$

$$\text{Say } 0.5 \text{ T/M}$$

$$\text{Total direct loads} = 2.66 + 0.5 = 3.16 \text{ T/M} = \mathbf{31.6 \text{ kN}}$$

Here considering that only 70% of Braking force will be on dirt wall & the rest of braking force will be on soil.

$$= \text{Braking force/mt.} = \frac{0.2 \times 14 \times 1}{5.255} = 0.53 \text{ T}$$

$$= \text{B.M. due to Braking force}$$

$$= 0.53 \times (1.2 + [0.83])$$

$$= 1.07 \text{ T-M}$$

Intensity of Earth Pressure **at Deck Level**

$$= 0.224 \times 1.8 \times 1.2$$

$$= 0.483 \text{ T/M}^2$$

Intensity of Earth Pressure at top of Abutment $C_e =$

$$= 0.224 \times 1.8 \times (1.2 + 0.825)$$

$$= 0.816 \text{ T/M}^2$$

B.M. due to Earth Pressure & Live Load

Surcharge/M width

$$= \frac{1}{2} = (0.816 - 0.483) \times 0.825 \times 0.42 \times 0.875$$

$$+ 0.483 \times 0.825 \times \frac{0.528}{2}$$

$$= 0.048 + 0.164$$

$$= 0.21 \text{ T-M}$$

Total BM at top of DIRT WALL

$$= 1.07 + 0.21$$

$$= 1.28 \text{ T-M} = 12.8 \text{ kN-m}$$

$$\text{Direct Stress} = \frac{3.16 \times 10^3}{30 \times 100}$$

$$= 1.05 \text{ Kg./Cm}^2$$

$$\text{Bending Stress} = \frac{1.28 \times 10^3}{\frac{1}{6} \times 100 \times 30^2}$$

$$= 0.09 \text{ Kg./Cm}^2$$

For M 30 Grade,

Permissible Bending Stress = 67 Kg./Cm²

Permissible Direct Compressive
Stress = 50 Kg./Cm²

$$= \frac{1.05}{50} + \frac{0.09}{67} \leq 1$$

$$= 0.021 + 0.001 \leq 1$$

$$= 0.022 \leq 1 \quad \text{HENCE OK.}$$