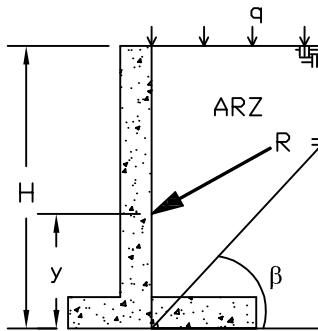


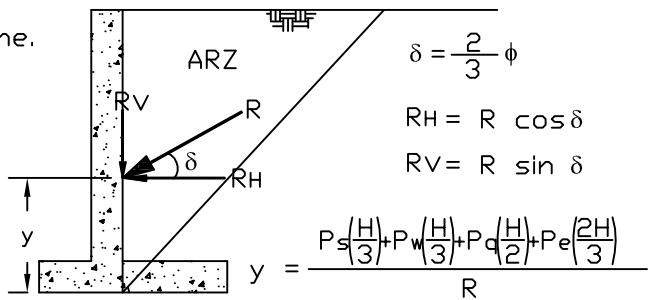
LATERAL EARTH PRESSURES (RANKINE ANALYSIS)



ARZ=Active Rankine Zone.
The backfill area
that influences
the retaining wall.

$$\beta = 45 + \frac{\phi}{2} \text{ (active case)}$$

$$\beta = 45 - \frac{\phi}{2} \text{ (passive case)}$$

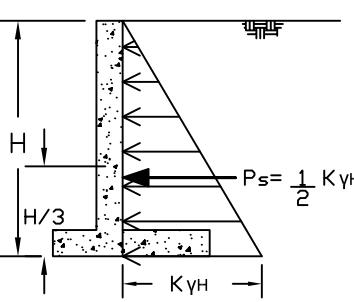


$$\delta = \frac{2}{3}\phi$$

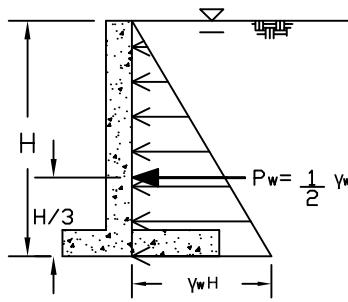
$$RH = R \cos \delta$$

$$RV = R \sin \delta$$

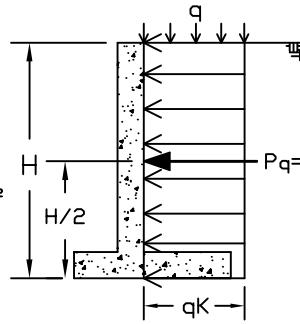
$$y = \frac{P_s(H/3) + P_w(H/3) + P_q(H/2) + P_e(2H/3)}{R}$$



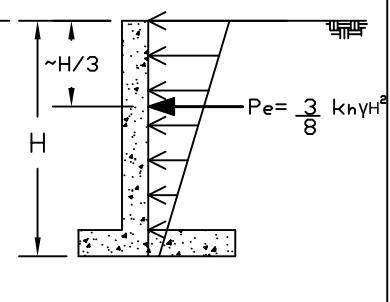
SOIL COMPONENT



PORE WATER COMPONENT

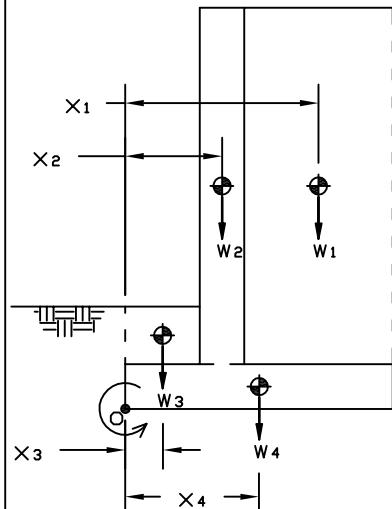


SURCHARGE COMPONENT



EARTHQUAKE COMPONENT

WALL OVERTURNING AND SLIDING ANALYSIS



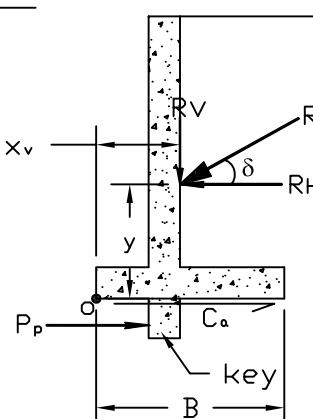
OVERTURNING

$$\frac{\sum W_i x_i + R_v x_v}{R_h(y)} \geq F.S$$

SLIDING

$$\frac{(\sum W_i + R_v) \tan \delta + C_a B}{R_h} \geq F.S \quad \text{no key}$$

$$\frac{(\sum W_i + R_v) \tan \delta + C_a B + P_p}{R_h} \geq F.S \quad \text{key}$$



$$\delta = \frac{2}{3}\phi$$

$$RH = R \cos \delta$$

$$RV = R \sin \delta$$

R = 'see analysis above'

P_p = P_s on key only using passive pressure ('see analysis above')

y = 'see analysis above'

$$\begin{aligned} W_1 &= (\text{area of soil above footing heel}) \gamma_{\text{soil}} \\ + W_2 &= (\text{area of wall concrete}) \gamma_{\text{concrete}} \\ + W_3 &= (\text{area of soil above footing toe}) \gamma_{\text{soil}} \\ + W_4 &= (\text{area of footing concrete}) \gamma_{\text{concrete}} \\ &= \sum W_i \end{aligned}$$

$$\begin{aligned} w_1(x_1) &= w_1(\text{distance from point 'o' to centroid of } W_1) \\ + w_2(x_2) &= w_2(\text{distance from point 'o' to centroid of } W_2) \\ + w_3(x_3) &= w_3(\text{distance from point 'o' to centroid of } W_3) \\ + w_4(x_4) &= w_4(\text{distance from point 'o' to centroid of } W_4) \\ &= \sum W_i x_i \end{aligned}$$