SEISMIC EARTH PRESSURES : (Applies to Retaining Walls over 12ft)

Static Lateral Earth Pressure:

$$P_a = \boxed{\frac{1}{2} K_a \gamma H^2} \qquad (1)$$

where $K_a = \tan^2\left(45 - \frac{\phi}{2}\right)$

H = Wall Height

γ = Soil unit weight

P_a = Static pressure

Seismic Lateral Earth pressure:

$$\Delta P_{ae} = \boxed{\frac{1}{2} \gamma H^2 * \frac{3}{4} K_h} \qquad (2)$$

where K_h = Horiz. ground acceleration (in g)

Combined (Static + Seismic) Earth pressure:

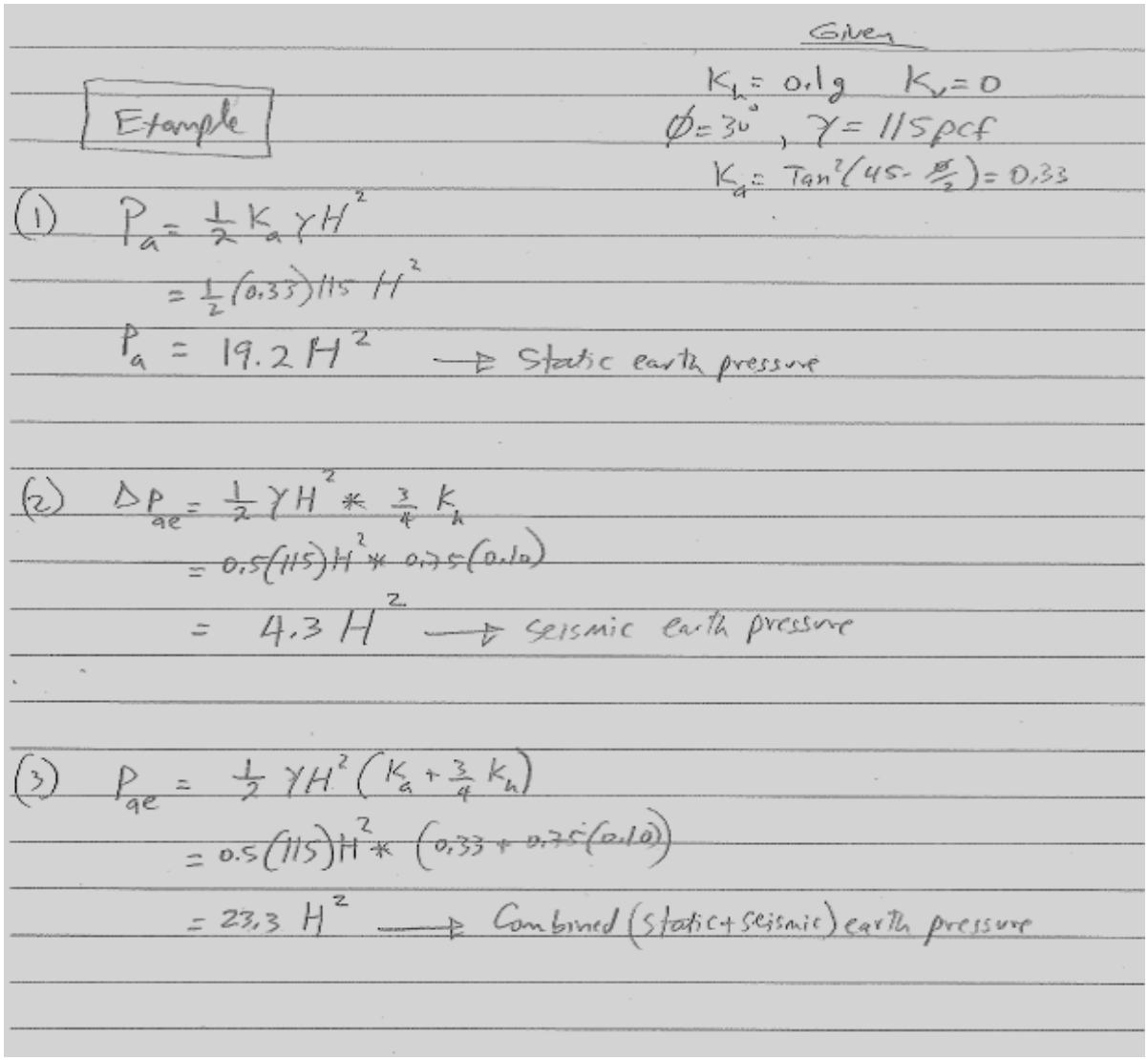
$$P_{ae} = \frac{1}{2} K_a \gamma H^2 + \Delta P_{ae}$$

$$= \frac{1}{2} K_a \gamma H^2 + \frac{1}{2} \gamma H^2 * \frac{3}{4} K_h$$

$$= \boxed{\frac{1}{2} \gamma H^2 \left(K_a + \frac{3}{4} K_h\right)} \qquad (3)$$

Example of Seismic earth Pressures on Retaining Walls:

The following calculation is for an active condition, and the retaining wall height is taken as H.



If you have a basement wall (at rest condition) multiply the above values by 1.33

So, for instance, the seismic component of earth pressure, (2) above would be 1.33 * 4.3 H = 5.7 H