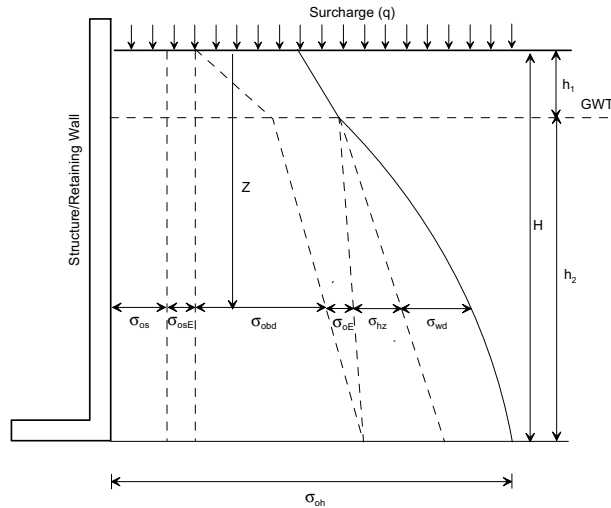


**Comanche Peak Nuclear Power Plant, Units 3 & 4**  
**COL Application**  
**Part 2, FSAR**



$$k_o = 1 - \sin \phi' \cong 0.47$$

$$\Delta K_{oE} = 2K_h \cong 0.20$$

$$\sigma_{os} = k_o q \cong 0.47q$$

$$\sigma_{osE} = \Delta K_{oE} q \cong 0.2q$$

$$\sigma_{obd} = k_o \gamma_t Z \cong 58.8Z$$

$$\sigma_{obd} \cong 58.8h_1 + 29.43(Z - h_1)$$

$$\sigma_{oE} = \Delta K_{oE} \gamma_e (H - Z) \cong 12.52(H - Z)$$

$$\sigma_{oE} \cong 12.52h_2 + 25(h_1 - Z)$$

$$\sigma_{hz} = \gamma_w (Z - h_1) \cong 62.4(Z - h_1)$$

$$\sigma_{wd} = \frac{7}{8} k_h \gamma_w \sqrt{h_2(Z - h_1)} \cong 5.46 \sqrt{h_2(Z - h_1)}$$

$$\sigma_{oh} = \sigma_{os} + \sigma_{osE} + \sigma_{obd} + \sigma_{oE} + \sigma_{hz} + \sigma_{wd}$$

Static at-rest earth pressure coefficient

Seismic at-rest earth pressure coefficient

Static lateral pressure due to surcharge

Seismic lateral pressure due to surcharge

Static lateral pressure due to backfill above GWT ( $Z \leq h_1$ )

Static lateral pressure due to backfill below GWT ( $Z > h_1$ )

Seismic lateral pressure due to backfill below GWT ( $Z > h_1$ )

Seismic lateral pressure due to backfill above GWT ( $Z \leq h_1$ )

Hydrostatic lateral pressure due to GWT ( $Z > h_1$ )

Hydrodynamic lateral pressure due to GWT ( $Z > h_1$ )

Static plus seismic active horizontal pressure

Notes:

- Units: lbs/ft<sup>2</sup> for pressure and ft for dimensions.
- Assumed compacted backfill properties:
  - Total unit weight:  $\gamma_t = 125$  lbs/ft<sup>3</sup>
  - Internal effective friction angle:  $\phi' = 32^\circ$
  - Effective cohesion intercept:  $C' = 0$
- Hydrodynamic component does not apply to low permeability soils ( $k < 10^{-3}$  cm/sec).
- Compaction earth pressure is not included based on the assumption that light compaction equipment is used for compaction of soil adjacent to below-grade walls.

**Figure 2.5.4-243 At-rest Earth Pressure**