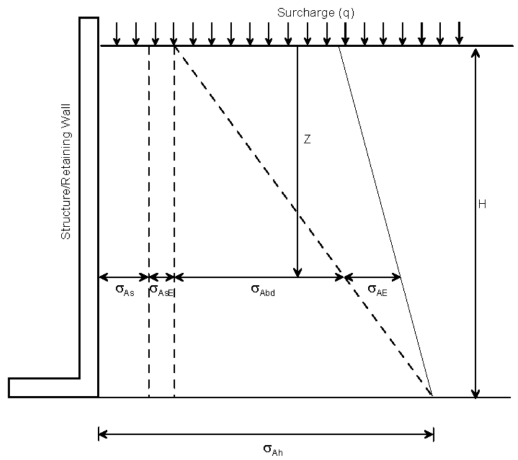
Active Earth Pressure including Seismic Component



$k_A = \tan^2(45 - \frac{\phi'}{2}) \cong 0.307$	Static active earth pressure coefficient
$\Delta K_{AE} = K_{AE} - k_A \cong 0.052$	Seismic active earth pressure coefficient
$\sigma_{As} = k_A q \cong 0.307q$	Static lateral pressure due to surcharge
$\sigma_{Abd} = k_A \gamma_t Z \cong 38.41Z$	Static lateral pressure due to backfill
$\sigma_{AsE} = \Delta K_{AE} q \cong 0.052q$	Seismic lateral pressure due to surcharge
$\sigma_{AE} = \Delta K_{AE} \gamma_t (H - Z) \cong 6.5(H - Z)$	Seismic lateral pressure due to backfill
$\sigma_{Ah} = \sigma_{As} + \sigma_{AsE} + \sigma_{Abd} + \sigma_{AE}$	Static plus seismic active horizontal pressure

Notes:

- Units: lbs/ft^2 for pressure and ft for dimensions.
- Assumed compacted backfill properties:
  - Total unit weight: γ_t =125 lbs/ft^3
  - Internal effective friction angle: ϕ' = 32°
  - Effective cohesion intercept: C′ = 0
- Hydrostatic pressure is not included because adequate wall drainage is provided.
- 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 2.5.4-242 Active Earth Pressure