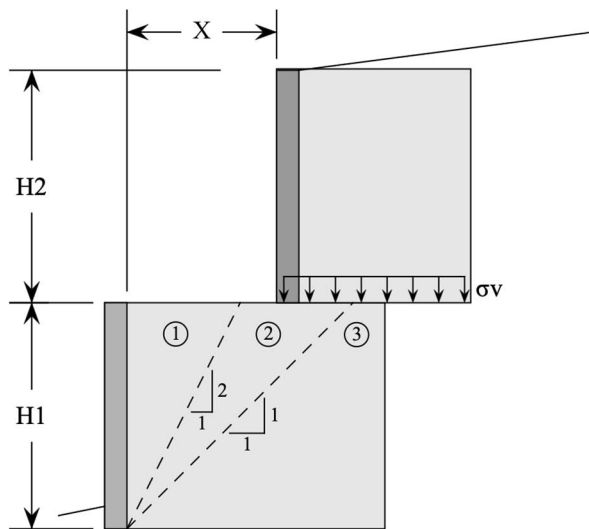


# Tiered Wall - Internal Analysis

The external stability analysis for tiered or terraced wall structures is primarily accomplished by global stability analysis software used in conjunction with wall design software. Global stability analysis should also check for internal failure planes passing through the lower wall, insuring that the reinforcement is long and strong enough. However, determining the actual internal load distribution is another matter. The internal analysis of the lower tier(s) becomes considerably more difficult as there is little agreement on how upper walls actually surcharge lower reinforced soil walls.

A trial wedge approach is probably best suited for determining internal reinforcement loads on a level by level basis in tiered configurations but this method can be difficult to model and calculate without the aid of a special computer analysis. Approximation techniques like shown below can also be utilized but may be conservative due to the limitations of such approaches.

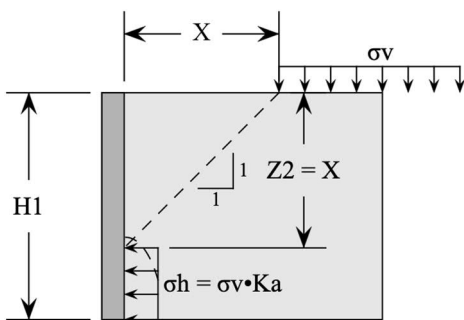
The figure below describes the three zones of influence and an approximation technique for distributing loads by superposition in addition to the normal earth pressure loads on the lower wall:



Zones of Influence

### Surcharge Zone Discussion

- ① When the upper wall setback falls within Zone 1 ( $X < H1/2$ ), the upper wall fully surcharges the lower wall and the lower wall could be designed as the bottom part of a larger wall keeping in mind that connection strength is affected by splitting the walls apart a short distance.
- ② When the upper wall setback falls within Zone 2 ( $H1/2 < X < H1$ ), the upper wall surcharges the lower portion of the lower wall as indicated and the reinforcement design of the lower wall should account for the additional surcharge where applicable.
- ③ When the upper wall falls outside the 1:1 influence line drawn for the back of lower wall Zone 3 ( $X > H1$ ), there is no direct internal surcharge on the lower wall and reinforcement lengths and strengths should be checked with a global stability analysis.



Simplified Surcharge Load Approximation

Note: This approximation or trial wedge method may not be appropriate for highly concentrated loads behind walls within Zone 1 and maybe Zone 2 that may be best suited for elastic analysis such as Boussinesq theory.