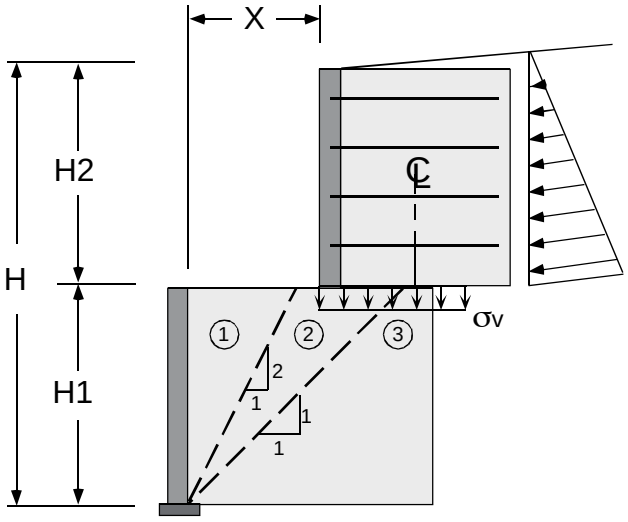
Tiered Wall - Internal Analysis

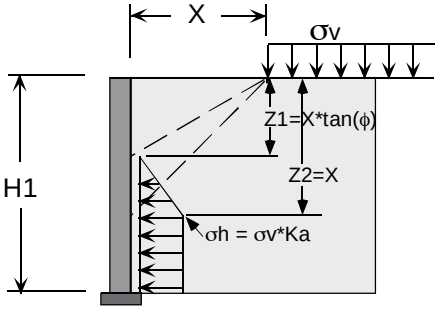
The external stability analysis for tiered or terraced wall structures is primarily accomplished by global stability analysis software used in conjunction with wall design software. Global stability analysis should also check for internal failure planes passing through the lower wall, insuring that the reinforcement is long and strong enough, but determining the actual 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 special software. Approximation techniques can be utilized but may be unduly conservative due to the obvious 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



Load Approximation

Zone Analysis

① When the upper wall setback falls within Zone 1 ($X < H1/2$) or $X < 4'$ minimum, the upper wall fully surcharges the lower wall and the lower wall should be designed accordingly 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.

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 only be checked for overall/global stability.