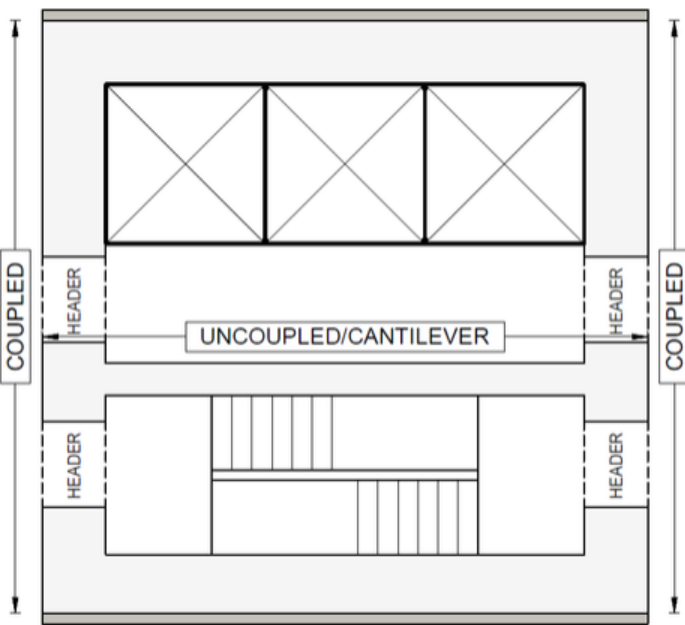


# BCBC 2018 CODE CHANGES - STRUCTURAL IMPLICATIONS

## COLUMN THICKNESS

Reduction capacity factors for thin columns have been added. **Columns 8" or less have 25% less stress capacity** than 12" columns and 10" columns have 12.5% less stress capacity than 12" columns. As a general guide **we suggest avoiding using 8" column that support 6-stories or more** and **avoid using 10" columns that support 20-stories or more**.

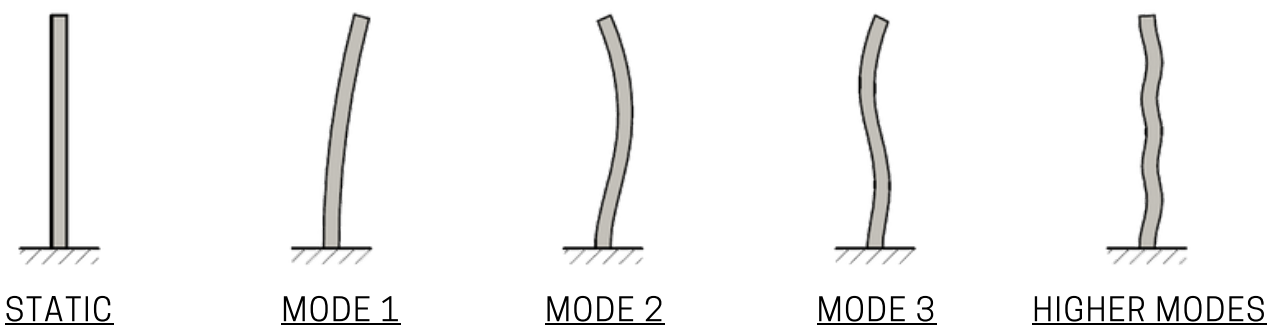


## CORE WALL THICKNESS

A new "higher mode effect" code clause increases shear loads in uncoupled walls thus requiring **increased wall thicknesses** by approx. 20% when compared to the previous code.

**Affected walls are the cantilevered/uncoupled walls that aren't linked by coupling (header) beams** and typically frame the back of the elevator bank, the side of the scissor stairs and the divider all between the elevator shaft and stairs.

## MODE SHAPES FOR LATERAL RESPONSE OF CORE WALL SYSTEM



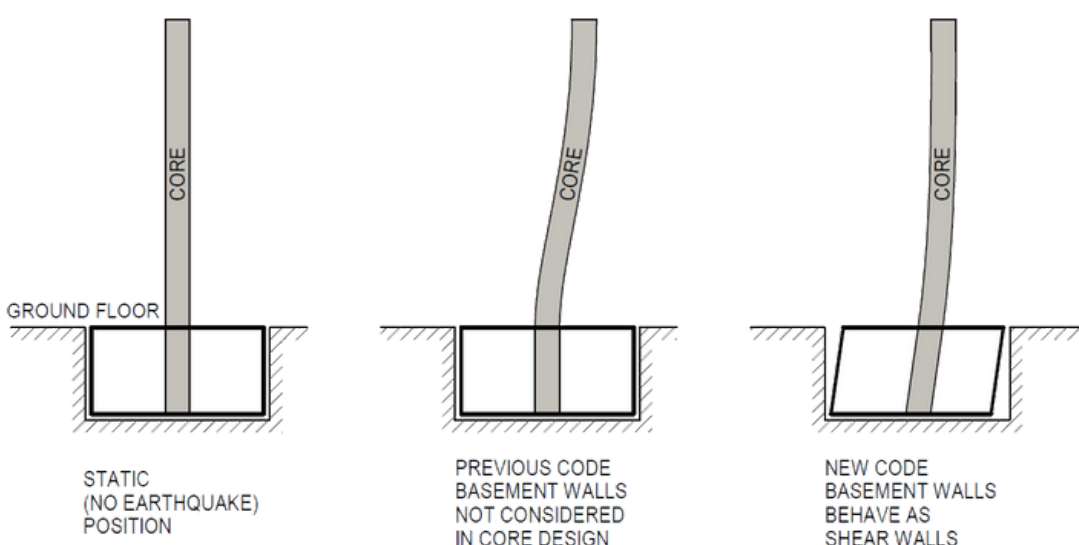
## FOUNDATIONS

Increased shear demand requirements will **increase footing depths on average by 25%** when compared to the old code, so overall an increase in concrete volume of approx. 25%. There will also be an increase in total foundation reinforcing weight of approx. 20% on average when compared to the previous code designs.

## BELOW GRADE BASEMENT WALLS

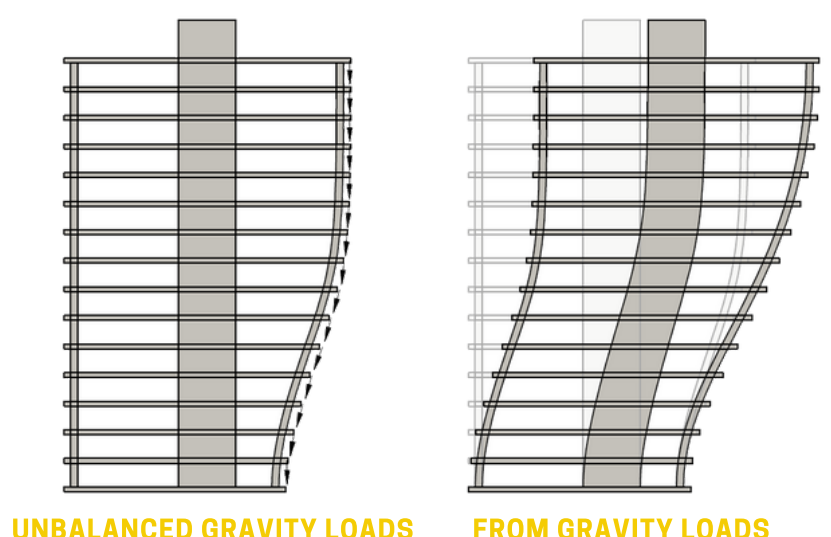
The podium/belowgrade structure now requires seismic rebar detailing. This means that the below grade exterior basement walls are now generally required to have **two faces of reinforcing steel in each direction** (vertical and horizontal each face) resulting in an increase of reinforcing in these walls of approx. 60% when compared to designs under the previous code requirements.

## EFFECT OF PODIUM AND BELOW GRADE WALLS ON CORE WALLS



## GRAVITY INDUCED LATERAL DEMAND (GILD)

A new structural seismic irregularity condition has been added to address framing conditions that induce horizontal loads on the lateral force resisting system due to gravity loads. These gravity lateral demands are typically a result of offset or sloping columns that require lateral resistance to maintain stability.



When the induced shear and overturning moments from GILD loading exceed the capacity of the core/ shear walls by a range of 6% to 20% (depending on the system), then non-linear time history studies are required to verify the core wall designs. This is what many of the jurisdictions in California and Washington State require for tall building design.