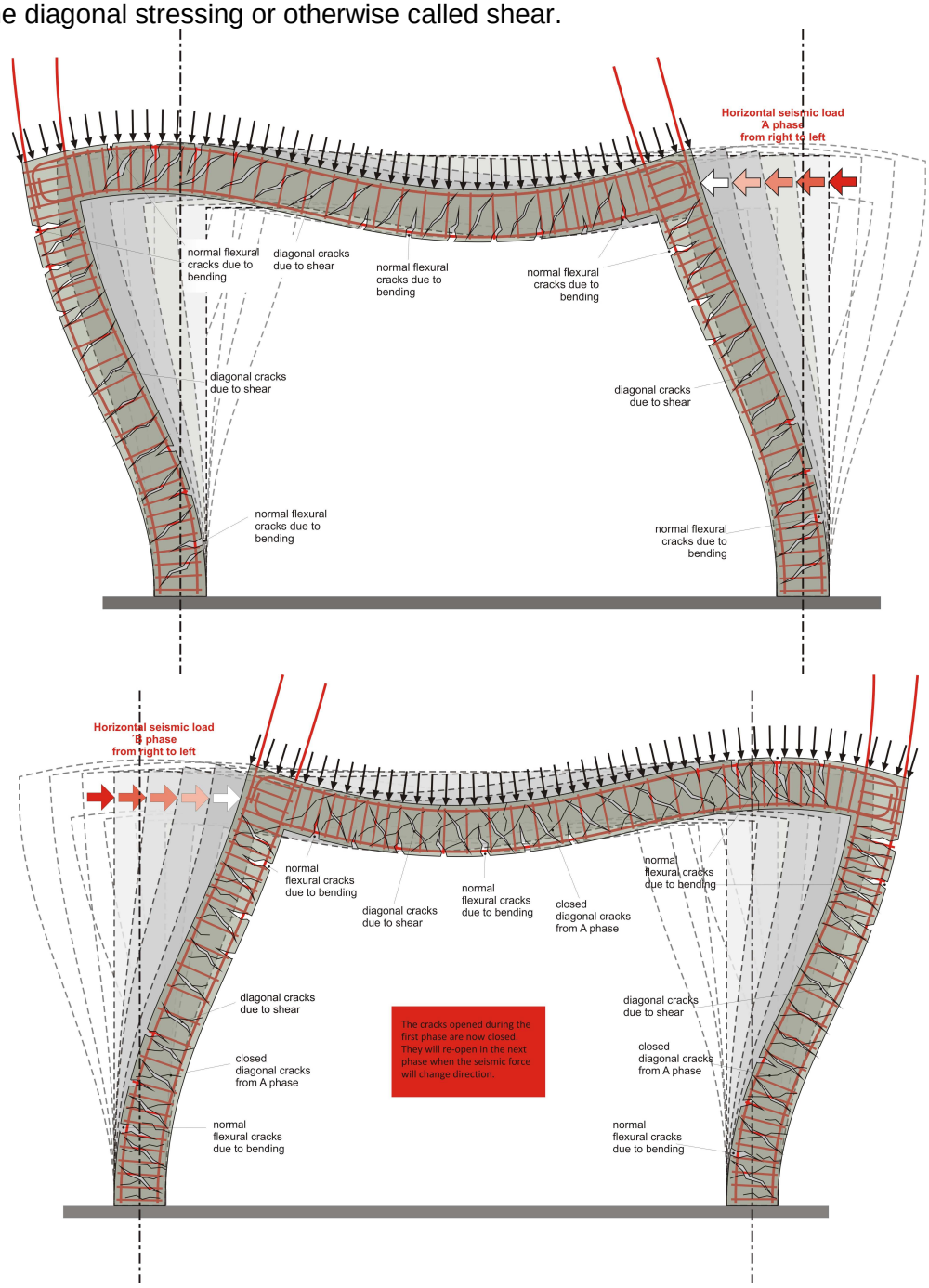
Fundamental rules in the reinforcement of antiseismic structural systems

The following needs – rules regarding the proper placement of reinforcement, derive from the behavior of structures:

Columns:

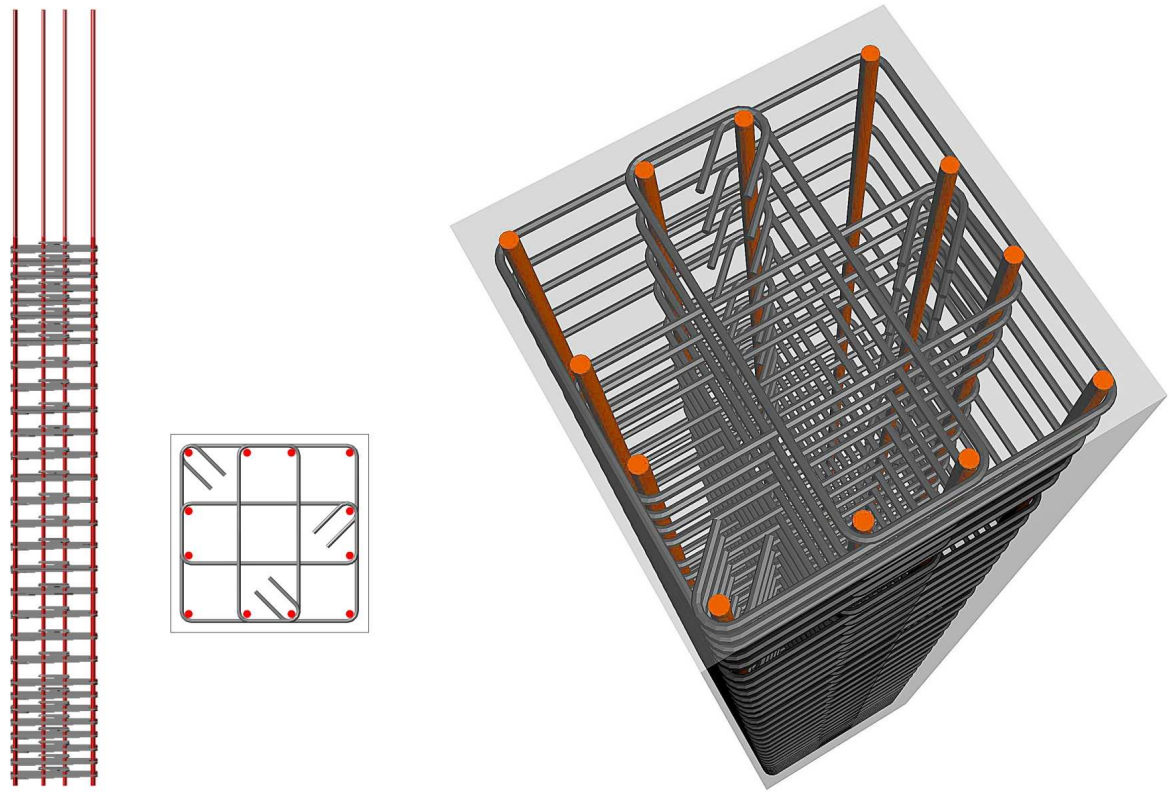
(α) Rebars must be symmetrically placed around the perimeter of the cross section since the tensile forces and therefore the inclined cracking constantly change direction.

(β) There must be enough, high strength and properly anchored stirrups. This reinforcement protects the member from the large diagonal cracks of alternating direction, caused by the diagonal stressing or otherwise called shear.

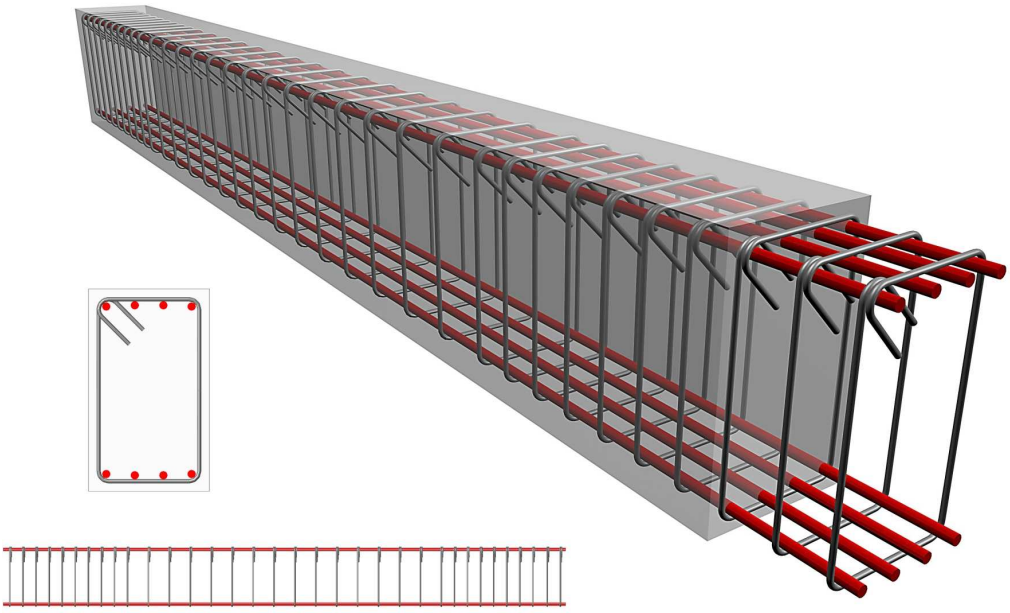


Behavior of a two–column frame during an earthquake

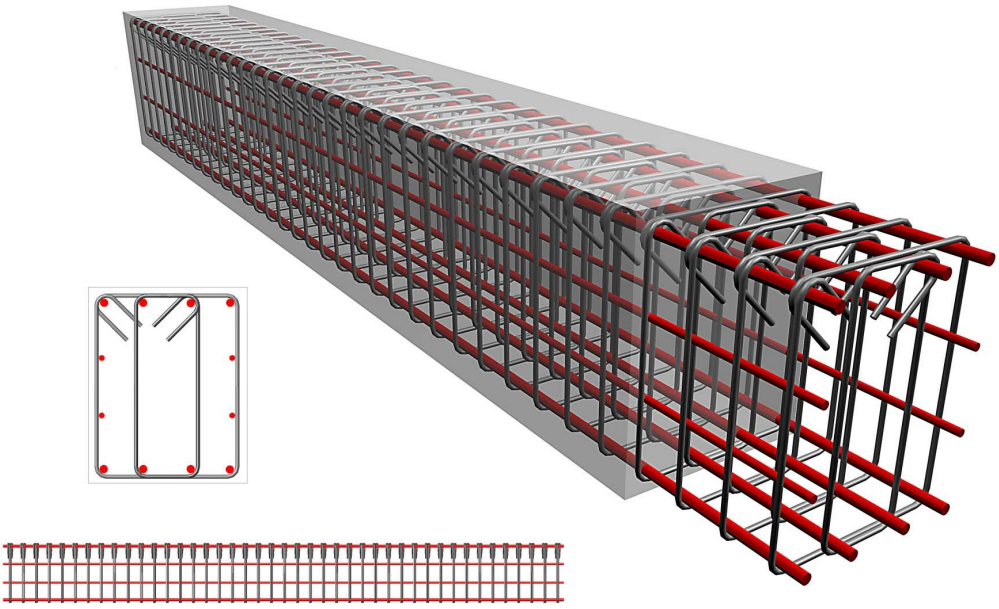
between a column and a staircase or masonry infill is probable then the need for ductility extents to the whole length of the column.



Column with cross-section 500x500 and three stirrups on every layer, required by the Seismic Regulation for ductility



Beam with ductility requirements



Beam with high ductility requirements

The need for column's capacity-overstrength

Capacity design ensures that the columns will have greater capacity than the adjacent beams therefore no matter how intense the seismic action will be, beam failure will precede the failure of columns. Failing beams will absorb part of the released seismic energy thus altering the structure's natural (fundamental) frequency and avoiding resonance. Generally, failure of one or more beams does not induce progressive failing, hence even in an extremely strong seismic event, the structure will not collapse and will retain a minimum serviceability level allowing its evacuation and most of the times its rehabilitation.