

3.3. SEISMIC DESIGN REQUIREMENTS FOR REINFORCED CONCRETE COLUMNS

3.3.1. Geometrical requirements

3.3.1.1 – Shorter dimension of columns with rectangular section shall not be less than 300 mm and section area shall not be less than 90000 mm². Diameter of circular columns shall be at least 300 mm. Minimum column dimensions may be reduced to 250 mm and minimum area of rectangular section may be reduced to 62500 mm² in buildings with no more than three stories above ground.

3.3.1.2 – Normalised axial force of column, v_d , shall satisfy the condition of $v_d < 0.65$.

3.3.2. Design shear forces of columns

3.3.2.1 – In columns the design values of shear forces shall be determined in accordance with the capacity design rule, on the basis of the equilibrium of the column under end moments $M_{i,d}$ (with $i = 1,2$ denoting the end sections of the column), corresponding to plastic hinge formation for positive and negative directions of seismic loading.

$$V_{Ed} = \frac{M_{1,d} + M_{2,d}}{l_{cl}} \quad (3.10)$$

The plastic hinges should be taken to form at the ends of the beams connected to the joints into which the column end frames, or (if they form there first) at the ends of the columns.

3.3.2.2 – End moments $M_{i,d}$ may be determined as follows:

$$M_{i,d} = 1.1 M_{Rc,i} \min \left(1, \frac{\sum M_{Rb}}{\sum M_{Rc}} \right) \quad (3.11)$$

The values of $\sum M_{Rc,i}$ and $\sum M_{Rc}$ shall be compatible with the column axial force(s) in the seismic design situation for the considered sense of the seismic action.

3.3.2.3 – End moments $M_{i,d}$ need not exceed those obtained from seismic analysis with $(q/T) = 1$.

3.3.3. Seismic detailing of columns

3.3.3.1 – The total longitudinal reinforcement ratio ρ_l shall be not less than 1% and not more than 4%. In symmetrical cross-sections symmetrical reinforcement should be provided ($\rho = \rho'$).

3.3.3.2 – At least one intermediate bar shall be provided between corner bars along each column side, to ensure the integrity of the beam-column joints.

3.3.3.3 – The regions up to a distance l_{cr} from both end sections of a column shall be considered as being critical regions.