3.3.3.4 – In the absence of more precise information, the length of the critical region l_{cr} (in metres) may be computed from the following expression:

$$l_{cr} = \max\left\{h_c \, , \, l_{cl} / 6 \, , \, 0.45\right\} \qquad \textbf{(3.12)}$$

3.3.3.5 – If l_c / h_c < 3, the entire height of the column shall be considered as being a critical region and shall be reinforced accordingly.

3.3.3.6 – Confinement reinforcement for the critical regions shall not be less than given by **Eq.(3.13)**.

$$\alpha\omega_{wd} = 30\,\mu_\varphi \nu_d\,\varepsilon_{sy,d}\,\frac{b_c}{b_o} - 0.035 \qquad \textbf{(3.13)}$$

where α is the confinement effectiveness factor, equal to $\alpha = \alpha_n\,\alpha_s$ with components α_n and α_s defined as follows:

(a) For rectangular cross-sections:

$$\alpha_n = 1 - \sum_n \left(\frac{b_i^2}{6\,b_o\,h_o}\right) \quad ; \quad \alpha_s = \left(1 - \frac{s}{2b_o}\right)\left(1 - \frac{s}{2h_o}\right) \qquad \textbf{(3.14)}$$

where n is the total number of longitudinal bars laterally engaged by hoops or cross ties; and b_i is the distance between consecutive engaged bars.

(b) For circular cross-sections with circular hoops:

$$\alpha_n = 1 \quad ; \quad \alpha_s = \left(1 - \frac{s}{2D_o}\right)^2 \qquad \textbf{(3.15)}$$

(c) For circular cross-sections with spiral hoops:

$$\alpha_n = 1 \quad ; \quad \alpha_s = \left(1 - \frac{s}{2D_o}\right) \qquad \textbf{(3.16)}$$

3.3.3.7 – A minimum value of ω_{wd} = 0.08 shall be provided within the critical region at the base of columns.

3.3.3.8 – Within the critical regions of the primary seismic columns, hoops and cross-ties, of at least 6 mm in diameter, shall be provided with the following conditions:

(a) The spacing, *s*, of the hoops (in millimetres) shall not exceed the value given by **Eq.(3.17)**.

$$s \;\le\; \min\left\{b_o/2 \, , \, 175 \, , \, 8d_{bL}\right\} \qquad \textbf{(3.17)}$$

(b) The distance between consecutive longitudinal bars engaged by hoops or cross-ties shall not exceed 200 mm, taking into account EN 1992-1-1:2004, 9.5.3(6).

3.3.4. Seismic detailing of beam-column joints

3.3.4.1 – The horizontal confinement reinforcement in joints of beams with columns should be not less than that specified in **3.3.3.6 – 3.3.3.8** for the critical regions of columns, with the exception of the case listed in the following paragraph.