

## ANNEX C (INFORMATIVE)

*Editorial Note: The material of this Annex shall be incorporated into the text of the next draft.*

### PRELIMINARY DIMENSIONING OF BOUNDARY ELEMENTS OF WALLS

(1) The following empirical expressions may be used for a pre-estimation of the values of the relevant ductility-related quantities  $l_c$  and  $\omega_{wd}$  (see 2.11.2.3) before the final analytical verification of walls.

(2) For a given value of  $q$  and a selected value of  $\omega_{wd}$  (for values of the effectiveness of confinement  $\alpha \approx 1/2 \div 1/3$ ), the required confined length  $l_c$  may be estimated as:

$$(l_c / l_w)_{req} \approx 0,1 + \lambda_1 \cdot \left( \frac{q}{2,5} \right)^2 \cdot ((\mu_d + \nu_d) - 0,1) \quad (C.1)$$

(3) For a given value of  $q$  and a selected value of  $l_c$ , the required mechanical volumetric ratio of closed hoops  $\omega_{wd}$  (for practical values  $\alpha \approx 1/2 \div 1/3$ ) may be estimated as:

$$\omega_{wd \text{ req.}} \approx 0,1 + \lambda_2 \cdot \left( \frac{q}{2,5} \right)^2 \cdot ((\mu_d + \nu_d) - 0,1) \quad (C.2)$$

(4) The parameters used in exp.(C.1) and (C.2) should be assumed as follows:

$$\mu_d + \nu_d = \frac{M_{Sd}}{b_w \cdot l_w^2 \cdot f_{cd}} + \frac{N_{Sd}}{b_w \cdot l_w \cdot f_{cd}} \quad (C.3)$$

$$\lambda_1 = \begin{cases} 1,1 - 2,0 \cdot \omega_{wd} & \text{if } \omega_{wd} < 0,4 \\ 0,3 & \text{if } \omega_{wd} > 0,4 \end{cases} \quad (C.4)$$

$$\lambda_2 = 1,5 - 2,0 \cdot (l_c / l_w) \quad (C.5)$$

Note: In the majority of cases, the required confined length  $l_c$  seldom exceeds values of approximately  $0,3 l_w$ , whereas the practical normalised estimator of axial action-effects  $(\mu_d + \nu_d)$  seldom exceeds a value of approximately  $0,5$ .