

**DRAFT AMENDMENT
FOR PUBLIC COMMENT**

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Eurocode 2 : Design of concrete structures – Part 1-1 : General rules and rules for buildings
(SS EN 1992-1-1 : 2008)

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Eurocode 2 : Design of concrete structures

– Part 1-1 : General rules and rules for buildings

AMENDMENT NO. 1

Month / Year

1. Modification to the National Foreword, Page v

In the section “National choices is allowed in EN 1992-1-1 through the following clauses”, between “6.4.4 (1)” and “6.4.5 (3)”, add “6.4.5 (1)”.

2. Modification to 3.3.2, Properties, Page 42

In Paragraph (2)P, replace “strength to proof strength ($f_{pk} / f_{p0,1k}$)” with “strength to proof strength ($f_p / f_{p0,1}$) $_k$ ”.

3. Modification to 3.3.4, Ductility characteristics, Page 43

In Paragraph (5), replace “ $f_{pk} / f_{p0,1k} \geq k$ ” with “($f_p / f_{p0,1}$) $_k \geq k$ ”.

4. Modification to 6.4.5, Punching shear resistance of slabs and column bases with shear reinforcement, Page 105

In Paragraph (1), replace:

“(1) Where shear reinforcement is required it should be calculated in accordance with Expression (6.52):

$$v_{Rd,cs} = 0,75 v_{Rd,c} + 1,5 (d/s_r) A_{sw} f_{ywd,ef} (1/(u_1 d)) \sin \alpha \quad (6.52)$$

where

- A_{sw} is the area of one perimeter of shear reinforcement around the column [mm²]
- s_r is the radial spacing of perimeters of shear reinforcement [mm]
- $f_{ywd,ef}$ is the effective design strength of the punching shear reinforcement, according to $f_{ywd,ef} = 250 + 0,25 d \leq f_{ywd}$ [MPa]
- d is the mean of the effective depths in the orthogonal directions [mm]
- α is the angle between the shear reinforcement and the plane of the slab

If a single line of bent-down bars is provided, then the ratio d / s_r in Expression (6.52) may be given the value 0,67.”

with the following text:

“(1) Where shear reinforcement is required it should be calculated in accordance with Expression (6.52):

$$v_{Rd,cs} = 0,75 v_{Rd,c} + 1,5 (d / s_r) A_{sw} f_{ywd,ef} [1 / (u_1 d)] \sin \alpha \leq k_{max} \cdot v_{Rd,c} \quad (6.52)$$

where

- A_{sw} is the area of one perimeter of shear reinforcement around the column [mm²];
- s_r is the radial spacing of perimeters of shear reinforcement [mm];
- $f_{ywd,ef}$ is the effective design strength of the punching shear reinforcement according to $f_{ywd,ef} = 250 + 0,25 d \leq f_{ywd}$ [MPa];
- d is the mean of the effective depths in the orthogonal directions [mm];
- α is the angle between the shear reinforcement and the plane of the slab;
- $v_{Rd,c}$ according to 6.4.4;
- k_{max} is the factor, limiting the maximum capacity that can be achieved by application of shear reinforcement.

NOTE The value of k_{max} for use in a country may be found in its National Annex. The recommended value is 1,5.

If a single line of bent-down bars is provided, then the ratio d / s_r in Expression (6.52) may be given the value 0,67.”.

5. Modification to 11.6.4.2, Punching shear resistance of slabs or column bases with shear reinforcement, Page 191

In Paragraph (1), *replace* the whole Expression (11.6.52) with the following one:

$$v_{Rd,cs} = 0,75 v_{Rd,c} + 1,5 (d / s_r) A_{sw} f_{ywd,ef} [1 / (u_1 d)] \sin \alpha \leq k_{max} \cdot v_{Rd,c} \quad (11.6.52)''.$$

6. Modification to 12.6.5.2, Simplified design method for walls and columns, Page 197

Replace the whole Paragraph (1):

“(1) In absence of a more rigorous approach, the design resistance in terms of axial force for a slender wall or column in plain concrete may be calculated as follows:

$$N_{Rd} = b \times h_w \times f_{cd,pl} \times \Phi \quad (12.10)$$

where

- N_{Rd} is the axial resistance
- b is the overall width of the cross-section
- h_w is the overall depth of the cross-section
- Φ Factor taking into account eccentricity, including second order effects and normal effects of creep; see below

For braced members, the factor Φ may be taken as:

$$\Phi = 1,14 \times (1 - 2e_{tot}/h_w) - 0,02 \times l_0/h_w \leq (1 - 2 \times e_{tot}/h_w) \quad (12.11)$$

where:

$$e_{tot} = e_o + e_i$$

- e_0 is the first order eccentricity including, where relevant, the effects of floors (e.g. possible clamping moments transmitted to the wall from a slab) and horizontal actions;
- e_i is the additional eccentricity covering the effects of geometrical imperfections, see 5.2”

with the following text:

“(1) In absence of a more rigorous approach, the design resistance in terms of axial force for a slender wall or column in plain concrete may be calculated as follows:

$$N_{Rd} = b \cdot h_w \cdot f_{cd,pl} \cdot \Phi \quad (12.10)$$

where

- N_{Rd} is the axial resistance;
- b is the overall width of the cross-section;
- h_w is the overall depth of the cross-section;
- Φ is the factor taking into account eccentricity, including second order effects; see below.

For braced members, the factor Φ may be taken as:

$$\Phi = 1,14 \cdot (1 - 2 \cdot e_{tot} / h_w) - 0,02 \cdot l_0 / h_w \leq 1 - 2 \cdot e_{tot} / h_w \quad (12.11)$$

where:

$$e_{tot} = e_0 + e_i + e_\varphi \quad (12.12)$$

- e_0 is the first order eccentricity including, where relevant, the effects of floors (e.g. possible clamping moments transmitted to the wall from a slab) and horizontal actions. In determination of e_0 an equivalent first order end moment M_{0e} can be used, see 5.8.8.2 (2);
- e_i is the additional eccentricity covering the effects of geometrical imperfections, see 5.2;
- e_φ is the eccentricity due to creep.

In some cases, depending on slenderness, the end moment(s) can be more critical for the structure than the equivalent first order end moment M_{0e} . In such cases Expression (12.2) should be used.”.

7. Modification to H.1.2, Bracing system without significant shear deformations, Page 215

In Paragraph (4), *replace* the whole Expression (H.4):

$$\xi = 7,8 \cdot \frac{n_s}{n_s+1,6} \cdot \frac{1}{1+0,7 \cdot k} \quad (H.4)''$$

with the following one:

$$\xi = 7,8 \cdot \frac{n_s}{n_s+1,6} \cdot \frac{1}{1+3,9k} \quad (H.4)''$$