5.5. DESIGN AND DETAILING RULES FOR MOMENT FRAMES

5.5.1. Specific criteria

5.5.1.1 – 4.3.1.1 applies.

5.5.1.2 – The composite beams shall be designed for ductility and so that the integrity of the concrete is maintained.

5.5.1.3 – Depending on the location of the dissipative zones, either **5.3.1.2(a)** or **5.3.1.2(b)** applies.

5.5.1.4 – The required hinge formation pattern should be achieved by observing the rules given in **4.3.1.2**, **5.5.3**, **5.5.4** and **5.5.5**.

5.5.2. Analysis

5.5.2.1 – The analysis of the structure shall be performed on the basis of the section properties defined in **5.2**.

5.5.2.2 – In beams, two different flexural stiffnesses should be taken into account: EI_1 for the part of the spans submitted to positive (sagging) bending (uncracked section) and EI_2 for the part of the span submitted to negative (hogging) bending (cracked section).

5.5.2.3 – The analysis may alternatively be performed taking into account for the entire beam an equivalent second moment of area I_{eq} constant for the entire span:

$$I_{eq} = 0.6\, I_1 + 0.4\, I_2 \qquad \textbf{(5.9)}$$

5.5.2.4 – For composite columns, the flexural stiffness is given by:

$$(EI)_c = 0.9\,(EI_a + 0.5 E_{cm} I_c + EI_s) \qquad \textbf{(5.10)}$$

Where E and E_{cm} are the modulus of elasticity for steel and concrete respectively; I_a , I_c and I_s denote the second moment of area of the steel section, of the concrete and of the rebars respectively.

5.5.3. Rules for beams and columns

5.5.3.1 – Composite T beam design shall conform to **5.4.2**. Partially encased beams shall conform to **5.4.5**.

5.5.3.2 – Beams shall be verified for lateral and lateral torsional buckling in accordance with EN 1994-1-1, assuming the formation of a negative plastic moment at one end of the beam.

5.5.3.3 – 4.3.2.2 applies.

5.5.3.4 – Composite trusses should not be used as dissipative beams.

5.5.3.5 – 4.3.3.1 applies.