

5.7. DESIGN AND DETAILING RULES FOR COMPOSITE ECCENTRICALLY BRACED FRAMES

5.7.1. Specific criteria

5.7.1.1 – Composite frames with eccentric bracings shall be designed so that the dissipative action will occur essentially through yielding in bending or shear of the links. All other members shall remain elastic and failure of connections shall be prevented.

5.7.1.2 – Columns, beams and braces shall be either structural steel or composite.

5.7.1.3 – The braces, columns and beam segments outside the link segments shall be designed to remain elastic under the maximum forces that can be generated by the fully yielded and cyclically strain-hardened beam link.

5.7.2. Analysis

5.7.2.1 – The analysis of the structure is based on the section properties defined in 5.2.2.

5.7.2.2 – In beams, two different flexural stiffnesses are 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).

5.7.3. Seismic links

5.7.3.1 – Links shall be made of steel sections, possibly composite with slabs. They may not be encased.

5.7.3.2 – The rules on seismic links and their stiffeners given in 4.5.2 apply. Links should be of short or intermediate length with a maximum length e .

(a) In structures where two plastic hinges would form at link ends:

$$e = 2 \frac{M_{p,link}}{V_{p,link}} \quad (5.12)$$

(b) In structures where one plastic hinge would form at one end of a link:

$$e < \frac{M_{p,link}}{V_{p,link}} \quad (5.13)$$

The definitions of $M_{p,link}$ and $V_{p,link}$ are given in 4.5.2.3. For $M_{p,link}$, only the steel components of the link section, disregarding the concrete slab, are taken into account in the evaluation.

5.7.3.3 – When the seismic link frames into a reinforced concrete column or an encased column, face bearing plates should be provided on both sides of the link at the face of the column and in the end section of the link.

5.7.3.4 – Connections should meet the requirements of the connections of eccentrically braced steel frames as in 4.5.4.