

CHAPTER 5

SEISMIC DESIGN REQUIREMENTS FOR STEEL – CONCRETE COMPOSITE BUILDINGS

5.1. SCOPE AND DESIGN CONCEPTS

5.1.1. Scope

5.1.1.1 – This Chapter applies to the seismic design of elements of composite steel-concrete buildings.

5.1.1.2 – The rules given in this Chapter are additional to those given in EN 1994-1-1:2004.

5.1.1.3 – Except where modified by the provisions of this Chapter, the provisions of Chapters 3 and 4 apply.

5.1.2. Design Concepts

5.1.2.1 – Earthquake resistant composite buildings shall be designed in accordance with one of the following design concepts (see **Table 5.1**):

(a) Concept A: Low-dissipative structural behaviour.

(b) Concept B: Dissipative structural behaviour with composite dissipative zones;

(c) Concept C: Dissipative structural behaviour with steel dissipative zones.

Table 5.1. Design concepts of composite buildings

Design concept	Structural ductility class	Behaviour factor q
A: Low dissipative structural behaviour	DCL	1.0
B or C: Dissipative structural behaviour	DCN	≤ 5.0

5.1.2.2 – In concept A, the action effects may be calculated on the basis of an elastic analysis without taking into account non-linear material behaviour but considering the reduction in the moment of inertia due to the cracking of concrete in part of the beam spans, in accordance with the general structural analysis rules defined in 5.2 and to the specific rules defined in 5.5 to 5.9 related to each structural type. Behaviour factor shall be taken as $q = 1$.

5.1.2.3 – In concept A the resistance of the members and of the connections should be evaluated in accordance with EN 1993 and EN 1994 without any additional requirements.

5.1.2.4 – In concepts B and C, the capability of parts of the structure (dissipative zones) to resist earthquake actions through inelastic behaviour is taken into account. Behavior factor shall be taken from **Table 5.2**. When adopting concepts B or C the requirements given in 5.2 to 5.9 should be fulfilled.

5.1.2.5 – In concept C, structures are not meant to take advantage of composite behaviour in dissipative zones; the application of concept C is conditioned by a strict compliance to measures that prevent involvement of the concrete in the resistance of dissipative zones. In