

Pakistan Building Code (Seismic Provisions 2007)

Chapter 7: Structural Concrete — Advanced Professional Interpretation

Purpose of Chapter 7

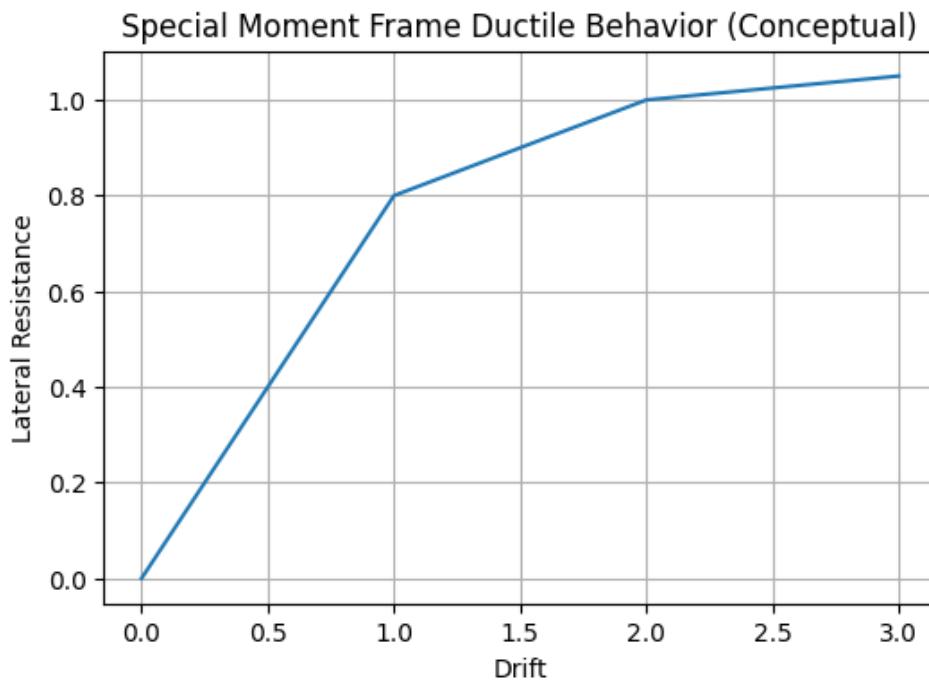
Chapter 7 provides detailed seismic design and detailing requirements for reinforced concrete structures. It ensures ductile behavior, energy dissipation, and prevention of brittle failure during strong earthquakes.

1. General Seismic Requirements for Concrete

The code requires proper analysis, strength reduction factors, and special detailing for members resisting earthquake forces. Ductility and confinement are the central design goals.

2. Special Moment Frames (SMF)

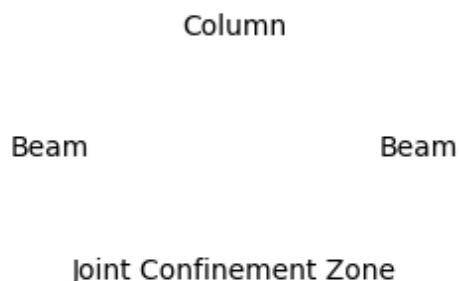
SMFs are highly ductile systems designed to undergo large inelastic deformations. They require strict detailing of longitudinal reinforcement, transverse confinement, and strong-column weak-beam philosophy.



3. Beam-Column Joint Requirements

Beam-column joints must be heavily confined to resist shear and maintain integrity during cyclic loading. Poor joint detailing is a common cause of collapse.

Beam-Column Joint Confinement Concept

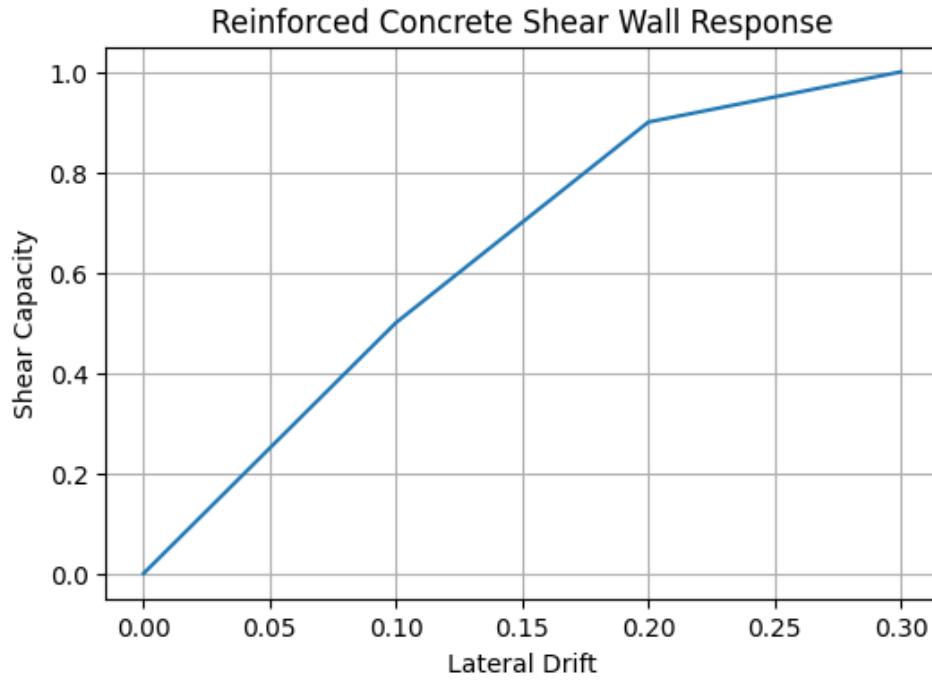


4. Columns in Seismic Frames

Columns must satisfy minimum flexural strength requirements and provide adequate transverse reinforcement for confinement. The strong-column weak-beam criterion is essential.

5. Reinforced Concrete Structural Walls

Structural walls provide major lateral resistance. Design must address flexure, shear, boundary elements, and coupling beams for ductile performance.



6. Structural Diaphragms

Diaphragms transfer lateral forces to vertical resisting elements. Minimum thickness, reinforcement, and boundary detailing are required for seismic performance.

7. Foundation Requirements for Concrete Systems

Footings, mats, pile caps, and grade beams must be designed to safely transmit seismic forces and maintain integrity under cyclic loading.

Professional Risk Notes

Common failures include inadequate joint confinement, violation of strong-column weak-beam rules, insufficient shear wall boundary elements, and poor diaphragm detailing. Strict adherence to detailing provisions is critical for seismic safety.