Pakistan Building Code (Seismic Provisions 2007)

Chapter 9: Masonry — Advanced Professional Interpretation

Purpose of Chapter 9

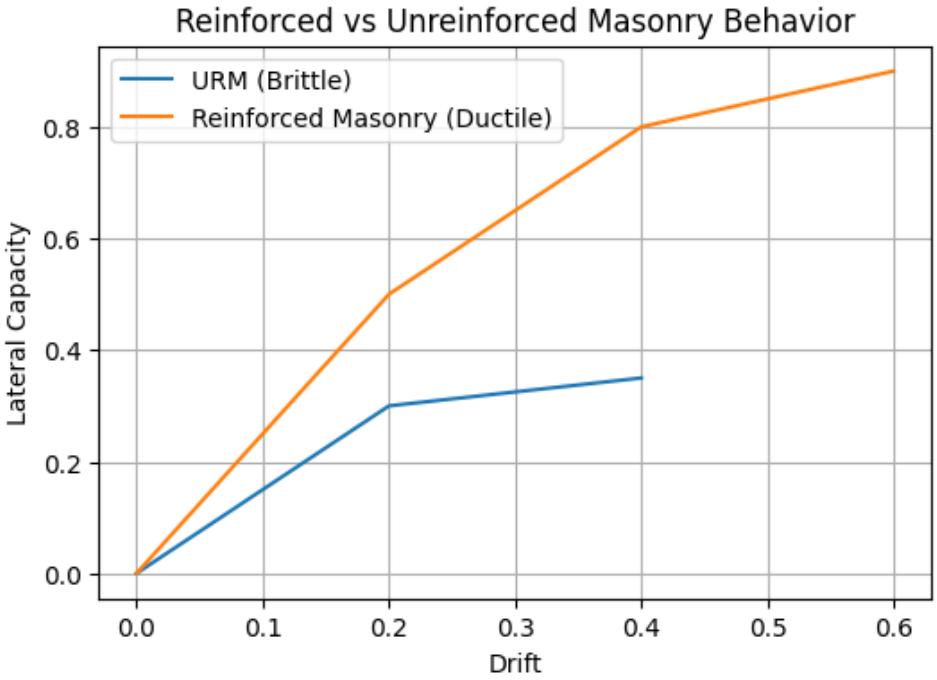
Chapter 9 provides seismic design requirements for masonry construction, which is widely used in Pakistan. The chapter addresses material quality, reinforcement, empirical design, and confined masonry to reduce brittle failure during earthquakes.

1. General Masonry Seismic Requirements

Masonry structures are inherently brittle. The code therefore emphasizes reinforcement, proper mortar and grout quality, and adequate quality assurance to improve seismic performance.

2. Reinforced vs Unreinforced Masonry

Unreinforced masonry (URM) performs poorly in earthquakes due to brittle cracking, while reinforced masonry provides improved ductility and energy dissipation.

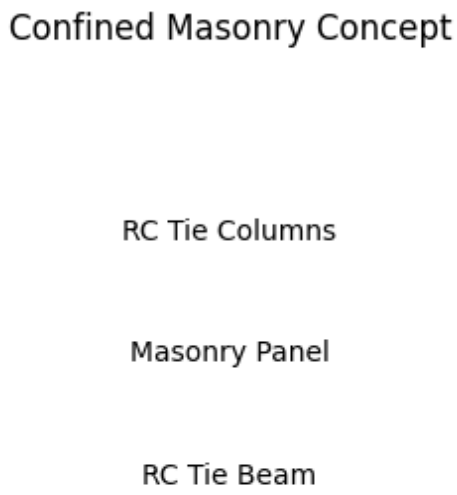


3. Material and Construction Quality

The code specifies standards for masonry units, mortar, grout, joint reinforcement, and placement procedures. Cold-weather construction and proper grouting are also addressed.

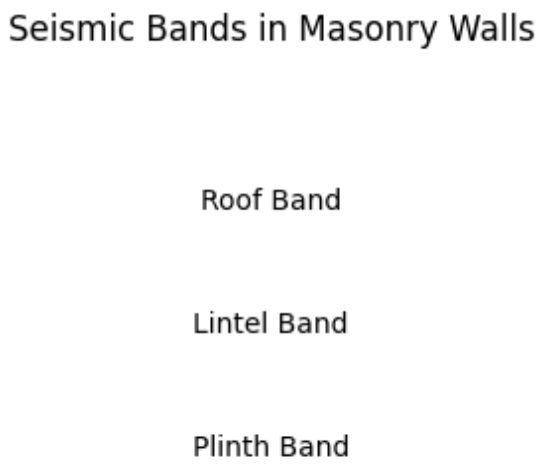
4. Confined Masonry Systems

Confined masonry uses RC tie columns and beams around masonry panels to significantly improve seismic performance. It is highly recommended for low- to mid-rise buildings.



5. Masonry with Seismic Bands

Horizontal seismic bands at plinth, lintel, and roof levels help maintain wall integrity and reduce out-of-plane collapse during earthquakes.



6. Design Approaches

The code permits working stress design, strength design, and empirical design methods. Engineers must select the appropriate method based on building importance and configuration.

Professional Risk Notes

Common failures in Pakistan include unreinforced masonry, missing seismic bands, poor mortar quality, and lack of confinement. Proper detailing and quality control are essential for safe masonry construction.