

## 3. How are Confined Masonry Buildings Different from Unreinforced Masonry and RC Frames with Masonry Infills?

### *3.1. Background*

Since CM construction technology is new to India, it is necessary to assess its advantages and disadvantages in comparison with alternative construction technologies that are currently practiced in the country. Unreinforced masonry (URM) construction has been traditionally practiced in India for centuries. RC frame construction with masonry infills is the prevalent contemporary construction practice in urban and suburban areas of India. A comparison between CM and alternative construction technologies in terms of design and construction practices is presented in this chapter.

### *3.2. CM and URM Buildings: A Comparison*

Both CM and URM buildings rely on walls to resist the effects of gravity and lateral loads. However, CM buildings have reinforcement in the form of horizontal and vertical RC confining elements that considerably enhance strength of CM walls and provide stability during damaging earthquakes, as explained in Chapter 4. Consequently, CM buildings are expected to perform better than URM buildings when subjected to earthquake ground shaking. The difference in seismic performance is expected to be more pronounced at higher earthquake intensities, when URM buildings are expected to experience severe damage and collapse. In comparison, CM buildings subjected to severe earthquake shaking may experience severe damage, but collapse is avoided in most cases (as discussed in Chapter 5).

CM buildings can be also compared with masonry buildings reinforced with horizontal RC bands and vertical reinforcing bars placed at wall intersections and other critical locations. According to IS 4326:2013 (BIS 2013), all masonry buildings located in seismic zones III to V of India must have reinforcement in the form of continuous horizontal RC bands, which are the key seismic design provisions for these buildings (Figure 3-1). These bands may be required at plinth, sill, lintel, and/or roof levels at every floor in a building, depending on the seismic zone and other criteria. Provided that adequate wall-to-floor connections are constructed, the bands enhance earthquake safety by ensuring integral box-like action of a building and preventing the collapse of masonry walls due to out-of-plane seismic effects (earthquake shaking perpendicular to wall surface). It is expected that these two building typologies would perform similarly at low earthquake intensities, however there may be a notable difference at higher earthquake intensities. CM construction is expected to provide enhanced seismic safety for buildings in seismic zone V of India.

It should be noted that in countries with a long history of CM construction practice, including Mexico, Chile, and Peru, CM buildings are constructed without RC bands at lintel and sill