

6. Conceptual Architectural Planning and Design of Confined Masonry Buildings

6.1 Background

Experience from past earthquakes has confirmed that buildings perform poorly when earthquake-resistant features have not been incorporated in the stages of their conceptualization, design, and/or construction. The conceptual design of a building, performed by architects, is critical to its satisfactory performance during an earthquake. Poor conceptual design of various building components by the architect will seriously impair the ability of structural engineers and contractors to incorporate adequate seismic safety in a building.

Architectural planning and design is a complex, iterative process, which aims to arrive at the best design solution to meet a host of requirements - including functional, behavioural, climatic, anthropometric - for an architectural solution (or building) that best meets the needs of the user. Structural design considerations are an integral part of this process. Once the architect has taken the decision to adopt CM as the construction technology, a few key architectural issues need to be addressed to ensure structural safety and adequate seismic performance of the building.

The key stakeholders who must be closely engaged in the design and construction of engineered buildings are architects, structural engineers, and contractors/builders. Architects play an important role in defining the overall shape, size and dimensions of a building. They may also determine the locations and lengths of CM wall panels in both plan directions. Structural engineers are responsible for providing numerical proof of structural safety and must work closely with architects to ensure that the design meets both structural and architectural requirements. Finally, when the design is completed, contractors and the construction crew are responsible for field implementation of the project. Structural elements must be constructed according to the construction drawings and specifications to ensure their structural and seismic safety. A competent construction supervision process must be in place to ensure that the constructed building reflects the architectural and structural engineering requirements as per the construction drawings.

In many municipal bodies in India, smaller buildings less than 10 m in height do not require the engagement of engineers, provided that the licensed building surveyor (LBS) has five years of experience in “planning, design and execution of building” (e.g. See KMC 2009). The LBS’s are usually individuals holding diplomas (and not professional degrees) in either civil engineering or architecture. Hence, engineers are often not involved in the design of low-rise buildings such as the CM buildings under discussion. The LBS/architects typically work directly with contractors throughout the construction process. It is common practice for the owners to procure the building materials and hire contractors who provide the labour force for the execution of the project. Site supervision is a very important component in these building projects. In the absence of engineering input, it is of critical importance for