ABSTRACT

Masonry construction practice has born approximately 10,000 years ago and is the oldest building technique known to man. With time construction practice has been advanced. However, there are still many traditional brick masonry buildings which were constructed locally with mud mortar and burnt clay bricks. Though these buildings have survived for centuries, they lack seismic resistant measures to fight the future severe earthquake hazards. Historical and monumental importance and safety of lives dwelling in those buildings motivates the research study in this field with the aim of their sustainability.

Survey data and material lab test results of a collaborative research project undertaken by Rits-DMUCH and IOE, TU have been taken to carry out analysis in this thesis work. Linear time history analyses have been carried out on five typical building models A48, B4-B5, B47, C26 and C25 using SAP2000V.14. The response of building so obtained from the analysis along with the capacity values obtained from HAZUS for URMM have been used to generate fragility curves which defines the probability of the building sustaining slight to complete damage in an earthquake based on different levels of ground motion intensity(PGA). Generation of fragility curves takes in to account variability of earthquake scenarios and building types. Fragility curves ascertain the probability of the different level of damage states which the building can experience during earthquake.

From this analytical study building C25 is found vulnerable to slight damage, buildings A48 and B4-B5 are found vulnerable to moderate damage, whereas buildings B47 and C26 are found vulnerable to complete damage. Results of fragility analysis are found different from that of RVS methodology of assessing vulnerability.