

## CHAPTER 47

### TECHNOLOGY CIVIL ENGINEERING

#### Doctoral Thesis

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**Seismic Vulnerability Assessment and Retrofitting of Existing Buildings.**  
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#### *Abstract*

Depending on the need of assessment, extent of assessment, speed of assessment, type of various segments used in assessment etc. the seismic vulnerability assessment methodologies are categorized in several groups. Different levels of sophistications have been used. All these methodologies can be broadly placed in two categories viz. Qualitative and quantitative methods. In general, Seismic vulnerability assessment is a comparison of capacity of the structure with seismic demand on the structure for the performance objectives decided. Hence, any assessment methodology, either qualitative or quantitative, will require capacity to be calculated (strength, stiffness, geometry, and other mechanical properties) and demand of earthquake determined (ground motion characteristics assessed for a nonlinear structure.) For quantification of damage, damage descriptors, (required structural response parameters), damage states and damage indices also play very important roles in a vulnerability assessment scheme. Different levels of seismic vulnerability assessment have been considered for varying complexity and specific need required for the seismic vulnerability assessment of existing building in the present study.

#### *Contents*

1. Introduction. 2. Literature survey. 3. Rapid assessment method. 4. Simplified assessment method. 5. Detailed assessment method. 6. Seismic vulnerability of infilled buildings. 7. Conclusions. Appendixes.