

## **Review on Fragility Functions for the Performance Assessment of Engineering Structures**

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### **ABSTRACT**

The fragility functions are used to assess the vulnerability of several infrastructure facilities due to natural hazards. Damage vulnerability assessment using fragility functions has started in early 90's. In this paper a review of the use of fragility functions for various engineering problems with special attention to those developed in the field of geotechnical engineering is reviewed. By referring to the above studies, the following conclusions can be derived. A brief summary on the fragility functions developed for different natural hazards are also reviewed. The relationships between the EDPs and IM are established and they are termed as probabilistic demand models (PDM). If the PDMs are developed for damage assessment due to seismic hazard, it is termed as probabilistic seismic demand models (PSDM). Using these PSDMs, the probabilities of exceeding the different damage states due to a seismic hazard can be plotted against the defined intensity measure of the seismic hazard. These plots are called as fragility curves. From the developed fragility curves, the probable damage state of the structure can be assessed for a given intensity measure. In turn, the expected loss and the retrofitting costs of the structure can be estimated for the future natural hazards.

**Keywords:** *Fragility Functions, Probabilistic Seismic Demand Models, PSDM, Damage Measure, Intensity Measure.*