International Journal of Civil, Structural, Environmental and Infrastructure Engineering Research and Development (IJCSEIERD)
ISSN(P): 2249-6866; ISSN(E): 2249-7978
Vol. 6, Issue 3, Jun 2016, 1-12

TRANS STELLAR
•Journal Publications •Research Consultancy

FRAGILITY ANALYSIS OF EXISTING STEEL BUILDING AND POSSIBLE REHABILITATION BY FUZZY EXPERT SYSTEMS UNDER BLAST AND DYNAMIC LOADS

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ABSTRACT

During recent years fragility analysis (FA) of steel building frame is investigated which can be used for preliminary estimate of its probability of failure. The risk analysis in FA procedure uses the format of probabilistic Risk Analysis and considers band limited white dynamic velocity at the bed rock as the seismic input and structural reflect. In this research as a case study, 67 steel building frame is modelled and analysied by pushover analysis with response of the steel frame is obtained by response spectrum method of analysis for multi-degree of freedom system. This paper focused on an analytical method for constructing fragility curves of a given class of existing structures, based on a stochastic approach and fuzzy expert system algorithm. In stochastic analysis the problem is related to the well-known threshold crossings theory connected to the evaluation of structural reliability. In many structural problems the most used reliability definition is the probability that system will not have a failure associated to a bilateral threshold crossing of a given level in the time interval. Fragility fuzzy curves are obtained in terms of probability of exceeding a given damage level by us- ing an approximate crossings theory of stochastic processes and compare with most used probabilistic approach that system will not have a failure associated to a bilateral threshold crossing of a given level in the time interval.

KEYWORDS: Fragility Analysis, Steel Frame, Fragility curves, Fuzzy Expert Systems

Received: Feb 22, 2016; **Accepted:** Apr 19, 2016**; Published:** Apr 22, 2016; **Paper Id.:** IJCSEIERDJUN201601

Original Article