

## **Enhancements in idealized capacity curve generation for reinforced concrete regular framed structures subjected to seismic loading**

### **ABSTRACT**

The designing of R/C framed structures subjected to seismic excitation generally is performed by linear elastic method, while current trend of codes of practice is moving toward increasing emphasis on evaluating the structures using non-linear static pushover (NSP) approaches. Recently, several NSP approaches, with varying degree of vigor and success, have been proposed. In this study, initially a comparative study has been made among different non-linear static methods for adopting the most suitable method of extracting the capacity curve of R/C framed structures. Then, a program was developed to overcome the difficulties of graphical iterative procedure of idealization proposed by FEMA-356. Subsequently, the comparative tool, which is a combination of the detected superior NSP method and the developed program, was used to investigate the effects of significant structural variables on idealized parameters of capacity curves of population of R/C framed structures. Eventually, the applicability of replacing the time-consuming NSP procedure by ANN for deriving the capacity curve was tested. The outcomes demonstrated the outperformance of interstorey-based scaling adaptive pushover in addition to high precision of the developed program. Furthermore, the distinct effects of each of the considered structural variables on idealized parameters were unveiled. Finally, an acceptable performance of ANN as an alternative to NSP procedure was certified.

**Keyword:** Capacity curve; Earthquake; Idealization parameters; Neural network; NSP; Pushover analysis; R/C framed structures