

A Hybrid Force/displacement Performance-based Seismic Design Procedure for RC Frames

Soha Elkassas¹, Ezzeldin Sayed-Ahmed², Ezzat Fahmy³

Department of Construction Engineering/ The American University in Cairo

New Cairo, 11835, Egypt

shkassas@aucegypt.edu; eysahmed@aucegypt.edu; ezzat@aucegypt.edu

Abstract - In this paper, the use of a recently proposed seismic design method called Hybrid force/displacement design is evaluated as an option for preliminary design of RC frames in the context of the latest framework for performance-based seismic design. A prototype RC frame is chosen as a design case study and is designed twice: using the traditional code method which is force-based and using the modified design procedure. The two designs are compared based on the number of iterations required, and the expected performance in reference to the results of nonlinear time-history analysis as the closest approximation of actual behaviour. It is concluded that the modified Hybrid method has higher efficiency and reliability in achieving targeted performance of RC frames, and thus is suitable for application in performance-based seismic design.

Keywords: Seismic design, RC frames, Performance-based design, Drift, Hybrid force-displacement design.