MACRO-MODELLING OF REINFORCED CONCRETE FRAME INFILLED WITH WEAK MASONRY FOR SEISMIC ACTION

Author(s): Mukesh Kumar¹, Fatima Khalid², Naveed Ahmad³

Volume: XV

No: 1

Pages: 15-38

Date: January 2018

Abstract:
One of the major hindrances in the accurate evaluation of seismic capacity of existing reinforced concrete (RC) structures in Pakistan is the incapability to realistically model weak masonry infilled RC frames which can be attributed to the lack of research. To address the research gap, quasi-static lateral load testing is performed on three full scaled RC frames. Of these, one was a bare frame which was subjected to cyclic lateral load. One infilled frame was subjected to half cycle of lateral load whereas the third infilled frame was subjected to cyclic lateral load. Based on the experimentally observed deformed shape of the frames, an eccentric two-strut model was developed. Three macro modelling techniques were employed to evaluate the most suitable parameters to simulate the seismic behaviour of RC frames with weak masonry infills. Accuracy of each model to predict the lateral force-displacement response and peak force was quantified and limitations of each model were examined in detail. The parametric study showed that the proposed eccentric two-strut model provides improved results for the deflected shapes of the columns. The results obtained using the most suitable parameters required for each macro model were compared with the existing studies.

For full paper, contact:
Prof Muhammad Masood Rafi
Editor-in-Chief, NED University Journal of Research
Ph: +92 (21) 99261261-8 Ext: 2413; Fax: +92 (21) 99261255
Email: NED-Journal@neduet.edu.pk
Website: http://www.neduet.edu.pk/NED-Journal

¹ Associate Professor, Department of Earthquake Engineering, NED University of Engineering and Technology, Pakistan, Ph. +92-(0)333-29769472, Fax: +92(0)21-99261255, Email: mukesh@neduet.edu.pk.
² Lecturer, Department of Civil Engineering, NED University of Engineering and Technology, Pakistan, Ph. +92-(0)21-99261261, Fax: +92(0)21-99261255, Email: fatimak@neduet.edu.pk.
³ Assistant Professor, Department of Civil Engineering, University of Engineering and Technology Peshawar, Pakistan, Ph. +92-(0)334-0592787, Email: naveed.ahmad@uetpeshawar.edu.pk.