17th Symposium on Earthquake Engineering
November 14-17, 2022
IIT Roorkee, India
Paper No. 186

Seismic Performance Assessment of Reinforced Concrete Moment Resisting Frame Designed by Force Based Design Method and the Performance Based Plastic Design Method

Rohit Vyas[1], Anoop Shirkol[1]

[1]Malaviya National Institute of Technology, Jaipur 302017, India

Abstract

Performance Based Plastic Design (PBPD) method is an advance method of seismic analysis since it includes preselected target drift and inelastic behavior of structure during a seismic event. In this study a 4, 8 and 12 storied RC-MRF have been analyzed and designed by Force Based Design (FBD) which is also known as codal method of design and by Performance Based Plastic Design (PBPD) method. A comparison is prepared in terms of seismic performance of the study building. The design guidelines and parameters are adopted as per IS code. A Non-linear static pushover analysis is the tool utilized to assess the seismic performance of study frames in terms of base shear displacement curve and drifts for specified limits. The result indicates that the base shear value for all PBPD frames at performance point is almost 2.2 times higher than the analytical solution. Similarly, all PBPD frames are within drift ratio limit of 0.02 while FBD frames surpassed the permissible drift ratio limit of 0.004 from which it can be said that PBPD frames have better seismic performance than FBD frames.

Keywords: RC-MRF, Force Based Design (FBD), Performance Based Plastic Design (PBPD), Performance level, Pushover analysis