Experimental Assessment of Retrofitted RC Frames With Different Steel Braces

Mehrzad TahamouliRoudsari, Alireza Entezari, MohammadHessam Hadidi, Omid Gandomian

PII: S2352-0124(17)30037-1
DOI: doi: 10.1016/j.istruc.2017.06.003
Reference: ISTRUC 201

To appear in: *Structures*

Received date: 27 January 2017
Revised date: 6 June 2017
Accepted date: 6 June 2017

Please cite this article as: Mehrzad TahamouliRoudsari, Alireza Entezari, MohammadHessam Hadidi, Omid Gandomian , Experimental Assessment of Retrofitted RC Frames With Different Steel Braces, *Structures* (2017), doi: 10.1016/j.istruc.2017.06.003

Experimental Assessment of Retrofitted RC Frames with Different Steel Braces

Mehrzad TahamouliRoudsari[a,1], Alireza Entezari[b], MohammadHessam Hadidi[C], Omid Gandomian[C]

[a]*Assistant Professor, Department of Civil Engineering, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran.*

[b]*M sc. in Civil Engineering, Department of Civil Engineering, Saveh Branch, Islamic Azad University, Saveh, Iran.*

[c]*M sc. in Civil Engineering, Department of Civil Engineering, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran.*

Abstract: Due to lack of sufficient concrete strength or change in design guidelines, some RC structures are in need of retrofitting. In the past few decades, using steel braces as a means with which to retrofit RC structures has become the subject of more attention and the reason can be attributed to fast implementation of the system as well as a significant increase in the stiffness and the strength of the structure. By adding different types of braces to moment resisting RC frames, the seismic properties of the structure including its ductility, strength reduction factor, stiffness, and strength undergo change. Retrofitting a building and designing it is only possible if the behavioral properties of the new hybrid seismic resisting system are known. This study experimentally investigates the effect of adding different types of steel braces on the behavioral properties of RC moment resisting frames. Eight RC moment resisting frames with identical steel bar configuration and concrete strength were built and seven of which were retrofitted with different braces such as the X, the knee, the chevron, the eccentric brace and the chevron brace with a vertical link. All the frames were subject to cyclic loading and their hysteresis load-displacement diagrams were plotted. Strength, stiffness, crack expansion, ductility, energy dissipation, and the strength reduction factor of all the frames were assessed. From the ductility and strength reduction factor viewpoints, the results indicate that the eccentric brace has a better performance compared to the other specimens. However, from the stiffness, strength, and cracking control standpoints, the behavior of the X brace is more desirable.

Keywords: RC moment resisting frame, retrofitting, steel brace, seismic properties, hysteresis.

[1] *Corresponding Author.* Tel:+989183591051*; Fax: +988337237470.*
E-mail Address: tahamouli@iauksh.ac.ir *(M.TahamouliRoudsari).*