International Journal of Engineering Science Invention (IJESI)
ISSN (Online): 2319 – 6734, ISSN (Print): 2319 – 6726
www.ijesi.org ||Volume 7 Issue 3 Ver. V|| March 2018 || PP12-13

Performance of Steel Bracings on Seismic Response In R.C Framed Structures

Deepthy.S.Nair
[1](*Ph-D Scholor Civil Engineering Department, Noorul Islam University Tamilnadu, India)*

Abstract *: The A Reinforced Concrete Building Should Be Designed To Have A Capacity To Carry Combined Loads (Dead, Live And Seismic Loads) At Certain Safety Level And At Certain Degree Of Reliability. Proper Account Of Loads, Material Properties, Structural System, And Method Of Analysis Are Fundamental Factors In The Design Of Structure. When This Design Is Finally Executed In The Construction Process, The Expected Performance Of The Structural Building Should Come Into Satisfaction. However, This Ideal Condition Is Not Always Realized. Performance Of Structural Building Could Be Below The Expected Criteria In Term Of Safety Level And Service Life Due To A Variety Of Causes.*

Keywords *– R.C Framed Structures, Seismic Responses, Steel Bracings*

Date of Submission: 15-03-2018 Date of acceptance 29-03-2018

I. INTRODUCTION

Concrete Frame Structures Are A Very Common Type Of Modern Buildings . Building Consists Of A Frame Or Skeleton Of Concrete. Earthquakes Are One Of The Most Destructive Of Natural Hazards. Earthquake Occurs Due To Sudden Transient Motion Of The Ground As A Result Of Release Of Elastic Energy In A Matter Of Few Seconds. A Basic Principle In Structural Design Is To Minimise The Effects Of Severe Earthquake Excitations And Allow The Structure To Absorb And Dissipate Energy Through Structural Ductility. However, Ductile Structures May Undergo Very Large Inelastic Deformation So That They May Be Severely Damaged After Strong Earthquake Excitations.Seismic Performance Of A Structure Are In Question Due To Increase Seismic Demand.

II. STRUCTURAL RESPONSES ON

Rc Framed Structures

Seismic Retrofitting Techniques Are Required For Concrete Constructions Which Are Vulnerable To Damage And Failures By Seismic Forces.

Seismic Retrofitting Techniques Are:

1. Inclusion Of Steel Bracings
2. Shear Walls
3. Changing Relationship Between Structural Elements

Earthquake Causes Shaking Of The Ground. So A Building Resting On It Will Experience Motion At Its Base. From Newton's First Law Of Motion, Even Though The Base Of The Building Moves With The Ground, The Roof Has A Tendency To Stay In Its Original Position. But Since The Walls And Columns Are Connected To It, They Drag The Roof Along With Them. This Tendency To Continue To Remain In The Previous Position Is Known As Inertia. In The Building, Since The Walls Or Columns Are Flexible, The Motion Of The Roof Is Different From That Of The Ground. When The Ground Moves, Even The Building Is Thrown Backwards, And The Roof Experiences A Force, Called Inertia Force. If The Roof Has A Mass M And Experiences An Acceleration A, Then From Newton's Second Law Of Motion, The Inertia Force F, Is Mass M Times Acceleration A, And Its Direction Is Opposite To That Of The Acceleration. Clearly, More Mass Means Higher Inertia Force. When The Ground Moves, Even The Building Is Thrown Backwards, And The Roof Experiences A Force, Called Inertia Force. If The Roof Has A Mass M And Experiences An Acceleration A, Then From Newton's Second Law Of Motion, The Inertia Force F, Is Mass M Times Acceleration A, And Its Direction Is Opposite To That Of The Acceleration. Clearly, More Mass Means Higher Inertia Force.

III. LITERATURE REVIEW

Ghobarah, Abou Elfath (2001) Evaluated The Seismic Performance Of A Low-Rise Reinforced Concrete Building Rehabilitated Using Eccentric Steel Bracing.A Three-Story Office Building Was Analysed . The Effectiveness Of The Eccentric Bracing & Effect Of Distributing The Bracing Over The Height Of The Rc Frame Was Studied. The Analysis Performed Indicated That The Link Deformation Angle Is An Important

Parameter (Γ). *Maheri Et Al.* (2003) Conducted Pushover Experiments On Scaled Models Of Ductile Rc Frames, Directly Braced By Steel X And Knee Braces. Results Indicate That The Yield Capacity And The Strength Capacity Of A Ductile Rc Frame Increased And Its Global Displacements Decreased . Results Indicate That X-Bracing Increases The Lateral Stiffness Of The Ductile Frame. *Viswanath K.G Et Al.*(2010) Study The Seismic Performance Of Rc Buildings Rehabilitated Using External Concentric Steel Bracing 4,8,12 & 16 Storey Building Is Analyzed For Seismic Zone Iv Using Staad Pro Software. The Effect Of The Distribution Of The Steel Bracing Along The Height Of The Rc Frame Was Studied. The Performance Of The Building Is Evaluated In Terms Of Global And Storey Drifts. Lateral Displacements Reduced By The Use Of X Type Of Bracing Systems And The Building Frames With X Bracing System Have Minimum Bending Moment. *Chethan B N Et Al.* (2017) Modelled And Analysed G+10 Rc Building And Studied Seismic Analysis Of Multistorey Rc Building With Mass Irregularity Using Etabs. Study Involves Mass Irregular Buildings With Floor Mass Is Varied By Considering The Slab Thickness And Thickness Is Varied From 0.125m To 0.25m And Analysis Is Done By Using Etab 2015 Version.Study Concluded That The Mass Irregular Models, The Models Provided With Thicker Slabs At Odd Floors Is Found To Be More Inefficient And The Buildings Provided With Thicker Slabs For Top Five Floors Is Scores Out As The Efficient One Among Irregular Buildings.

IV. FIGURES AND TABLES

Steel Bracings Are Of Mainly Two Types. External Bracing: Attaching Steel Bracings To Exterior Frames

Internal Bracing: Attaching Steel Bracings To Individual Units Or Panels.

Table.1 Difference Between Bracing Systems

Concentric Bracing System	Eccentric Bracing System
Increases Lateral Stiffness Of System Attract Large Inertia Force During Earthquake Decreases Bending Moments And Shear Force In Column Increases Axial Compression In Column	Reduce Lateral Stiffness Of System Improve Energy Dissipation Capacity Lateral Stiffness Depends On Flexural Stiffness Of Beams And Columns

V. CONCLUSION

Above Studies It Can Be Concluded That The Time History Analysis Gives The Structural Response More Accurately In Comparison With Equivalent Static And Response Spectrum Analysis As It Incorporates The P-Δ Effects And The Material Non Linearity Which Is True In Real Structures. With The Introduction Of Bracings The Structure Become Life Safe. The Difference In The Lateral Drift Between Shear Wall Model And Concentric Bracing Model Is Negligible In Top Storey And Vice Versa In Bottom Storey. From The Literature Studies Its Clear That Eccentric Bracing Systems Is More Beneficial.

Acknowledgements

I Would Like To Express My Sincere Gratitude To All The Scholars Whose Articles Are Cited And From That A Valuable Help Received For Completing This Review Paper. The Authors Are Also Grateful To Authors, Editters And Publisher Of Those Journals And Articles From Where The Literature For This Articles Has Been Reviewed And Discussed

REFERENCES

[1]. A. Ghobarah , H. Abou Elfath, Rehabilitation Of A Reinforced Concrete Frame Using Eccentric Steel Bracing, Engineering Structures ,Vol 23 (2001) ,Pp-745–755

[2]. M.R. Maheri, R. Kousari,M. Razazan, Pushover Tests On Steel X-Braced And Knee-Braced Rc Frames, Engineering Structures ,Vol 25 (2003), Pp- 1697–1705

[3]. A. Massumi1 And A.A. Tasnimi , Strengthening Of Low Ductile Reinforced Concrete Frames Using Steel X-Bracings With Different Details, The 14 World Conference On Earthquake Engineering October 12-17, 2008, Beijing, China

[4]. L. Di Sarnoa, A.S. Elnashaib, Bracing Systems For Seismic Retrofitting Of Steel Frames, Journal Of Constructional Steel Research, Vol 65 (2009), Pp- 452–465

[5]. Viswanath K.G , Prakash K.B. , Anant Desai, Seismic Analysis Of Steel Braced Reinforced Concrete Frames, International Journal Of Civil And Structural Engineering, Vol 1, 2010

[6]. Mohammad Eyni Kangavar, Seismic Propensity Of Knee Braced Frame (Kbf) As Weighed Against Concentric Braced Frame (Cbf) Utilizing Etabs And Opensees, International Journal Of Engineering And Advanced Technology (Ijeat) , Vol-5 June-2012

[7]. H. El-Sokkary, K. Galal, Analytical Investigation Of The Seismic Performance Of Rc Frames Rehabilitated Using Different Rehabilitation Technique, Engineering Structures, Vol 31 (2009) ,Pp-1955-1966

[8]. Marco Valente, Seismic Protection Of R/C Structures By A New Dissipative Bracing System, The 2nd International Conference On Rehabilitation And Maintenance In Civil Engineering, Vol 54 (2013) , Pp-785 – 794.

Deepthy.S.Nair"Performance of Steel Bracings on Seismic Response In R.C Framed Structures"International Journal of Engineering Science Invention (IJESI), vol. 07, no. 03, 2018, pp12-13