



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 5, May 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

Literature Review on Seismic Performance of Floating Column in Multistory Building

Prashik Dongare, Prof. Sushant M. Gajbhiye

P.G. Student, Department of Civil Engineering, Guru Nanak Institute of Engineering and Technology, Nagpur,
Maharashtra, India

Associate Professor, Department of Civil Engineering, Guru Nanak Institute of Engineering and Technology, Nagpur,
Maharashtra, India

ABSTRACT: In the present situation structures with drifting column is a regular component in the advanced multistory development in metropolitan India. Such elements are profoundly bothersome in building implicit seismically dynamic regions. This review features the significance of unequivocally perceiving the presence of the drifting column in the examination of buildings. Substitute measures, including firmness equilibrium of the main story and the story above, are proposed to lessen the abnormality presented by the drifting columns. FEM codes are created for 2D multi-story outlines with and without drifting columns to concentrate on the reactions of the construction under various tremor excitation having distinctive recurrence content keeping the PGA and time span factor steady. The time history of floor uprooting, entomb story float, base shear, upsetting second are figured for both the edges with and without drifting column.

KEYWORDS: FEM, Time History, ETABS.

I. INTRODUCTION

A column should be an upward part beginning from establishment level and moving the heap to the ground. The term drifting column is additionally an upward component which (because of compositional plan/site circumstance) at its lower level (end Level) lays on a shaft which is an even part. The bars thusly move the heap to different columns underneath it.

There are many tasks in which drifting sections are embraced, particularly over the ground floor, where move supports are utilized, so that more open space is accessible in the ground floor. These open spaces might be needed for get together lobby or stopping reason. The exchange supports must be planned and nitty gritty appropriately, particularly in earth tremor zones. The segment is a focused burden on the bar which upholds it. Taking everything into account, the section is regularly accepted stuck at the base and is hence taken as a point load on the exchange pillar. STAAD Pro, ETABS and SAP2000 can be utilized to do the examination of this sort of construction. Drifting sections are sufficiently equipped to convey gravity stacking yet move brace should be of satisfactory aspects (Stiffness) with exceptionally insignificant redirection.

Looking forward, obviously, one will keep on making structures fascinating rather than repetitive. In any case, this need not be done at the expense of helpless conduct and quake security of structures. Design includes that are negative to seismic tremor reaction of structures ought to be stayed away from. If not, they should be limited. At the point when unpredictable highlights are remembered for structures, an extensively more elevated level of designing exertion is needed in the foundational layout but the structure may not be comparable to one with straightforward building highlights.

Thus, the designs previously made with these sorts of spasmodic individuals are jeopardized in seismic areas. However, those constructions can't be obliterated, rather study should be possible to fortify the design or a few medicinal elements can be recommended. The segments of the main story can be made more grounded, the solidness of these sections can be expanded by retrofitting or these might be furnished with supporting to diminish the sidelong disfigurement.

II. LITERATURE REVIEW

- Maison and Neuss [15], (1984), Members of ASCE have performed the computer analysis of an existing forty four story steel frame high-rise Building to study the influence of various modeling aspects on the predicted dynamic properties and computed seismic response behaviours. The predicted dynamic properties are compared to the building's true properties as previously determined from experimental testing. The seismic response behaviours are computed using the response spectrum (Newmark and ATC spectra) and equivalent static load methods.
- Also, Maison and Ventura [16], (1991), Members of ASCE computed dynamic properties and response behaviours OF THIRTEEN-STORY BUILDING and this result are compared to the true values as determined from the recorded motions in the building during two actual earthquakes and shown that state-of-practice design type analytical models can predict the actual dynamic properties.
- Arlekar, Jain & Murty [2], (1997) said that such features were highly undesirable in buildings built in seismically active areas; this has been verified in numerous experiences of strong shaking during the past earthquakes. They highlighted the importance of explicitly recognizing the presence of the open first storey in the analysis of the building, involving stiffness balance of the open first storey and the storey above, were proposed to reduce the irregularity introduced by the open first storey.
- Awkar and Lui [3], (1997) studied responses of multi-story flexibly connected frames subjected to earthquake excitations using a computer model. The model incorporates connection flexibility as well as geometrical and material nonlinearities in the analyses and concluded that the study indicates that connection flexibility tends to increase upper stories' inter-storey drifts but reduce base shears and base overturning moments for multi-story frames.
- Balsamo, Colombo, Manfredi, Negro & Prota [4] (2005) performed pseudodynamic tests on an RC structure repaired with CFRP laminates. The opportunities provided by the use of Carbon Fiber Reinforced Polymer (CFRP) composites for the seismic repair of reinforced concrete (RC) structures were assessed on a full-scale dual system subjected to pseudodynamic tests in the ELSA laboratory. The aim of the CFRP repair was to recover the structural properties that the frame had before the seismic actions by providing both columns and joints with more deformation capacity. The repair was characterized by a selection of different fiber textures depending on the main mechanism controlling each component. The driving principles in the design of the CFRP repair and the outcomes of the experimental tests are presented in the paper. Comparisons between original and repaired structures are discussed in terms of global and local performance. In addition to the validation of the proposed technique, the experimental results will represent a reference database for the development of design criteria for the seismic repair of RC frames using composite materials.
- Vasilopoulos and Beskos [23], (2006) performed rational and efficient seismic design methodology for plane steel frames using advanced methods of analysis in the framework of Eurocodes 8 and 3 . This design methodology employs an advanced finite element method of analysis that takes into account geometrical and material nonlinearities and member and frame imperfections. It can sufficiently capture the limit states of displacements, strength, stability and damage of the structure.
- Bardakis & Dritsos [5] (2007) evaluated the American and European procedural assumptions for the assessment of the seismic capacity of existing buildings via pushover analyses. The FEMA and the Euro code-based GRECO procedures have been followed in order to assess a four-storeyed bare framed building and a comparison has been made with available experimental results.
- Mortezaei et al [17] (2009) recorded data from recent earthquakes which provided evidence that ground motions in the near field of a rupturing fault differ from ordinary ground motions, as they can contain a large energy, or “directivity” pulse. This pulse can cause considerable damage during an earthquake, especially to structures with natural periods close to those of the pulse. Failures of modern engineered structures observed within the near-fault region in recent earthquakes have revealed the vulnerability of existing RC buildings against pulse-type ground motions. This may be due to the fact that these modern structures had been designed primarily using the design spectra of available standards, which have been developed using stochastic processes with relatively long duration that characterizes more distant ground motions. Many recently

designed and constructed buildings may therefore require strengthening in order to perform well when subjected to near-fault ground motions. Fiber Reinforced Polymers are considered to be a viable alternative, due to their relatively easy and quick installation, low life cycle costs and zero maintenance requirements.

- Ozyigit [19], (2009) performed free and forced in-plane and out-of-plane vibrations of frames are investigated. The beam has a straight and a curved part and is of circular cross section. A concentrated mass is also located at different points of the frame with different mass ratios. FEM is used to analyze the problem.

OBJECTIVE

- To study the behavior of multistory buildings with floating columns under earthquake excitations.
- Finite element method is used to solve the dynamic governing equation.
- Linear time history analysis is carried out for the multistory buildings under different earthquake loading of varying frequency content.
- The base of the building frame is assumed to be fixed. Newmark's direct integration scheme is used to advance the solution in time.

III. CONCLUSION

- The behavior of multistory building with and without Stub column is studied under different earthquake excitation.
- The compatible time history and Elcentro earthquake data has been consider.

REFERENCES

- [1] Agarwal Pankaj, Shrikhande Manish (2009), "Earthquake resistant design of structures", PHI learning private limited, New Delhi.
- [2] Arlekar Jaswant N, Jain Sudhir K. and Murty C.V.R, (1997), "Seismic Response of RC Frame Buildings with Soft First Storeys". Proceedings of the CBRI Golden Jubilee Conference on Natural Hazards in Urban Habitat, 1997, New Delhi.
- [3] Awkar J. C. and Lui E.M, "Seismic analysis and response of multistory semirigid frames", Journal of Engineering Structures, Volume 21, Issue 5, Page no: 425-442, 1997.
- [4] Balsamo A, Colombo A, Manfredi G, Negro P & Prota P (2005), "Seismic behavior of a full-scale RC frame repaired using CFRP laminates". Engineering Structures 27 (2005) 769– 780.
- [5] Bardakis V.G., Dritsos S.E. (2007), "Evaluating assumptions for seismic assessment of existing buildings ".Soil Dynamics and Earthquake Engineering 27 (2007) 223–233.
- [6] Brodericka B.M., Elghazouli A.Y. and Goggins J, "Earthquake testing and response analysis of concentrically-braced sub-frames", Journal of Constructional Steel Research ,Volume 64, Issue 9, Page no: 997-1007,2008.
- [7] Chopra, Anil k. (1995), "Dynamics of structures", Prentice Hall.
- [8] Daryl L. Logan (2007), "A First Course in the Finite Element Method", Thomson, USA
- [9] Fall H.G (2006), "Direct Stiffness Method For 2D Frames-Theory of structure".



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details