

Strength irregularities in multistoried building using base isolation and damper in high Seismic zone: A theoretical Review

Mohit Kumar Prajapati¹, Sagar Jamle²

¹M. Tech Scholar Department of Civil Engineering, Oriental University, Indore, India

Email: Prajapatimohit73@gmail.com

²Assistant Professor Department of Civil Engineering, Oriental University, Indore, India

Email: sj.sagarjamle@gmail.com

Abstract—When it comes to the development there are lots of ways to provide great advancement in the sphere of construction. The phase of development is in its modest to adopt all possible and ready to be used methods in the construction line. The only obstacle in the path of construction is the natural disaster which directly or indirectly creates hurdles. The one such catastrophe is Earthquake. Earthquakes are never ending challenges which engineers face in front of them. Good Engineer always research for best and more suitable ways to sort out the standing or upcoming problems. The task become more complex when it has to be fitted well with modern design approach and the challenges such as earthquake. The Floating column is one such modern techniques used which has to be implied safely without endangering the life and the property and carefully dealing in the high seismic zone.

Keywords—Base-isolation, Damper, High Seismic Zone, Response Spectrum Method, Structural irregularities.

I. INTRODUCTION

The Earthquake are the most vulnerable and biggest threat which causes severe damages. Earthquake can struck at any time and any place. When it comes to its true form it never spares anything and ruin everything around it. But this is not the end the life comes with no break it has to go on and on. The engineers are at their best to find every possible study, apply all science and theory to deal more successfully to all these uncertainties.

Advance engineering is used in building construction for many different adoptions in construction designs and requirement which is unavoidable to be implied as an element.

When building with irregularities are used it causes lot more problems in the field of construction, the shear displacement, story drift etc. are the problems which are generally faced cause the floating columns are not considered good in the construction but the need for more special requirement and more access floating columns are liked by many owners or builders. One big reason is the unescapable and obligatory need can't be avoided. The use of passive and active devices or combination of both can

be used all together to dealt with the lateral forces which a building comes into contact in wind and seismic activity.

The Base-isolation and Dampers are used to mitigate the hazardous effects which a structure face in the natural calamity. Base-isolation separate building from rocking from rest part of the ground motion and hence keeping in safe zone. The Dampers act as shock bodies to stop the damaging effects to the important building property and building as a whole. It acts an energy absorbing device which are installed externally.

II. LITERATURE SURVEY

Practices and detailed study are required to gather much more suitable ways to create more understanding related to seismic effects. Engineers are fore more excited to learn new tactics to venture more adoptable and ease of methods to be used in a friendly manner. Good solution is the one which is beneficial in a much better way.

In ground motion due to earthquake creates vibration which affects serviceability and integrity of the structure. Bracing, Base-isolation and dampers are used as a control

method and their results are compared by the Time History analysis (Mohit M. Baruwala et. al. (2018)).

Different Dampers are used in R C Building and results of structure are compared with and without dampers using Response Spectrum method.(M. S. Langde et. al. (2017)).

Dampers reduce the vibration of the high-rise structure and to predict suitable position for the location of damper to study the performance of the building(N. Prajapati et. al. (2017)).Software analysis through Etabs 2015 with use of LRB bearing. Base isolation helps to shortcut vibrations moving to the top levels of the building reducing deflections (Bhavana Balachandraet. al.(2015)).

Seismic analysis of RC Multistorey building with and in the absence of FVD to know its behaviour in both Cases (S. Lakshmishireenbanuet. al.(2019)).Results are compared for building with fixed base and dampers using Time History Analysis and Etabs 2016 (Abhishek Kumar Maurya (2018)).

Using SAP 2000 on RC Structure having Floating column. Floating column produce the objectionable undistributed loads on the structure which produce torsion movement on the building (Sharma R. K. et. al. (2016)).

Higher displacement values are achieved with the use of floating member. Time history analysis gives more results of displacement than other methods of the dynamic analysis. Also, more storey drift at different levels (R. Goudet. al. (2017)).

LRB isolator is used as an isolation system in framed structure using SAP 2000. Isolation help to minimize displacement and deflection values. With increase in the height or levels in the building displacement at each level increases (R. B. Ghodkeet. al. (2015)).

III. EXPECTED OUTCOMES AND NEED OF THE STUDY

Minimum the risk better and safe is the life. The very fundamental quote which has a deep meaning. A good Engineer is the one who never stops and keep doing best with the use of his developed knowledge and skills.

The study which are yet made are far more less sufficient to develop better solutions and to know the more worthy solutions further studies and more engineering has to be applied to get more wonderful results.

To study more about the topic, get more into detail about the building and its nature to the coming situation. The way a building response to the forces it has to deal with. The need here is to make a structure safe from the

external unpredictable forces. A safe structure means a safe life and a step towards modern construction.

IV. PROBLEM FORMULATION AND FUTURE OBJECTIVES

Structure irregularities in a building storey make it a soft storey. The purpose of study is to get to know how a floating column affect a building regularity. Finding the shear force and bending moment values. Comparative study of floating column member structure with only base-isolation and with base-isolation and dampers used together.

The software analysis for the multi-storey RC Frame structure to various modes of the structure, base shear value, frequencies and time periods and storey drift by the response spectrum using civil software.

V. CONCLUSION

The work which are ongoing on the subject of seismic effect has brought many facts and figures about the requirement to further investigate the more valuable results. The collected information obtained from the previous research has helped a lot to get into detail of the topic. The study has helped to better know the various methods of analysis which can be worked with different types of structures. This software has made it much simpler to evaluate the forces, to study the effect of forces on building and its behavior.

The very conclusion which are as follows:

1. These irregularities has to be avoided as much practically as possible as they invite the more undistributed load. It makes structure irregular. But with better methods to avoid the undistributed loads and need of floating columns study where has to be used should be used precautious manner.
2. More ductile detailing is required in the case of floating column member.
3. Increased storey drift and displacement due to vertical irregularity.
4. Calculation of S.F. and B.M. values.
5. Base-isolation reduce base shear and reduce lateral forces.
6. Dampers help to dissipate the kinetic energy generated in the building due to seismic forces.A conclusion section must be included and should indicate clearly the advantages, limitations, and possible applications of the paper. Although a conclusion may review the main

points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

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