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Smart Earthquake Resistant of RCC Building Structure: An Overview

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***Abstract*—Simulation of collapse procedure of a scaled reinforced concrete structure is carried out and compared with the results obtained by spring base isolator experiments. The experiment was performed using RC building model and analyzes the time of cracking under Magnified excitation.**

The experiment was performed using three storied RC building. Springs-with-damper base isolator installed under a three-storey building. It is a base isolation device approximately similar to Lead Rubber Bearing.

This experiment is totally based on frequency ranges. In this experiment we compare our structure from different frequencies of an earthquake and analyze the results i.e. in which frequency, cracking starts in RCC building structure.

Keywords—Spring Base Isolator, Earthquake Resistant Structure

I. INTRODUCTION

Earthquake resistant techniques are Base isolation [1], Energy dissipation device [2], Spring Base Isolator structure [3]. For the protection of building from different magnitudes of an earthquake, use Spring Base Isolator Structure technique. Generally Spring Base Isolator is a base isolation device which is used for conservation of various building and non-building structures adjacent to potentially harm lateral impacts of strong earthquakes.

Fig. 1.Spring Base Isolator Structure [8]

Springs with damper base isolator installed beneath a three storey town house. It is a base isolation device approximately equal to Lead Rubber Bearing.

One of two three storey townhouses like this, which was well instrumented for the recording of both vertical and horizontal accelerations on their floors and the ground, has survived a flinched shaking during an earthquake.

Spring base isolator structure generally works:-

- When earthquake strikes the building does not moves
- Building is rested on springs (Spring Isolator)
- Helps to avoid cracking
- It is suitable for hard soils only

The rest of the work is standardizing as follows: part 2 discusses and converges about the outline of experiment and concepts. We summarize our proposed section briefly in part 3, which is the methodology part. Finally, we summarize our review work; conclude the work and some future scope in part 4 and 5 subsequently.

II. PRELIMINARIES

In this section, we describe the outline of experiment and concepts regarding spring isolator in brief:

A. Outline of Experiment

Simulation of cracking process of RC structure is carried out and compared with the results obtained by spring base isolator structure experiment [1]. The experiment was performed using three storied RC building. Springs-with-damper base isolator installed under a three-storey building. It is a base isolation device approximately similar to Lead Rubber Bearing [3].

This experiment is totally based on frequency ranges. In this experiment we compare our structure from different frequencies of an earthquake and analyze the results i.e. in which frequency, cracking starts in RCC building structure.

This study will focus particularly on earthquake building design and smart technology process in INDIA [4]. Interviews with experts in this field show that there is scope to look at better individual structures, but also the whole infrastructure of cities. Furthermore, consideration has been given to how smart process could be developed to reduce localized destruction [5]. Exploration into the adaptation of this smart technology will hint whether structural stability and fatalities could be drastically reduced [6].

B. Concepts

1. When the quake comes the system dissipates energy in the building cores and exteriors [9].
2. The frames are free to rock up and down within fittings fixed at their bases [10].

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Fig. 2.Prototype model of spring Base isolator structure

III. METHODOLOGY

A. Installation process of spring base isolator structure by a section plan

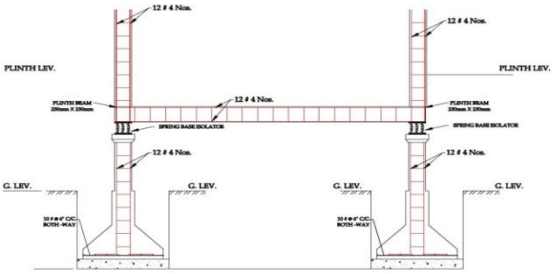

Fig.3. Section plan (Spring Base isolator Structure)

Fig. 3, represents a section plan in a proper scaled proportion i.e. Proto type scale model:

- 1:10H
- 1:10V

Here, G.LEV. Is denoted as Ground level, # represent diameter of reinforcement bar and @ represents center to center spacing of the diameter bar [2].

B. Cracking Analysis under Expand Excitation

1. Failure starts by excessively high cracking and move forward by yield and cut of reinforcement at base columns and beams [11].
2. Collision of the failed beams with other structural members during collapse causes intense damage for the lower floors [12].
3. Even though columns and beams of lower floors suffer absolute damage, the upper floor suffers almost no damage but they moved together in the rigid body motion and rotate around the failed structural element till they collide with the ground [13].

IV. CONCLUSION

1. In the construction of a building, particularly against earthquakes, there are many aspects to consider. Most of them are included in the design, one of the most important parts, such as the regular shape, appropriate structure, the calculation of high rigidity and good stability; other with the choice of site for the building, as floor firm and good foundation; other with the choice of materials, as lightweight or the materials to dissipate energy; and finally with the execution of the work, as quality of construction or set of finishes and installations.
2. Taking into deliberation all these tips and they are carried out well, the likelihood that the building in question hold increases, always depending on the scale of the earthquake that always can surprise us and not pleasantly [14].
3. Stiffening element of the set, reducing the lateral displacements. It is important to have the cores or minimizing the eccentricity in order to avoid torsion in the overall structure [15-16-17].

V. FUTURE SCOPE OF STUDY

For collapse/ cracking mechanism of structures, additional effects like:

- Buckling of reinforcement bars
- Spalling of concrete cover

Are needed to be modelled which are not taken into account in this analysis.

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