



“Analysis of Earthquake Resistances Building With And Without Lightweight Material”.

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Abstract- we are see overall study about earthquake resistance building. The main goal of earthquake resistance building is to design building that can sustain seismic activity of reasonable magnitude. In this paper we discuss about to prevent the building from earthquake effect there are several technics that are use now a days such as base isolation, damper, bracings etc we can study the different seismic zones in India. This analysis is carried out by using ETABS software. ETABS are commonly used to analyze high and low rise building, shysrapers and concrete structure.

keywords- earthquake resistance building, seismic activity, seismic zones, ETABS software, analysis of building.

1. Introduction

In last 35 years we see that the demand of earthquake engineering increases, as the previous data we can see there are several earthquake has happen in India. As we see in last 3 decade from 1985 to 2020 the data says that nearly or more than 125 millions people died and huge amount of property loss.

In India, according to GOI ,there is no reason free from earthquake. In the India major earthquakes are reported near different zone (Himalayan belt) on a daily basis. And there some major earthquake have observed on deccan plateau about 60% of the Indian landmass Can be sustain several earthquake.

An earthquake is the sudden shaking of Surface of the earth caused by the passage of seismic waves through the earth Curst. earthquake vibration occurs in all direction radiating from epicenter. earthquake is used to describe two thinkgs like, Sudden slip on fault and resulting Ground Shaking and radiated seismic energy, earthquake can create huge damage to life and property depending upon its magnitude. The sudden release of magnitude energy can cause structure of vibration and inertia force are acting on structure.

Autoclaved Aerated Concrete Block : [AAC]

- AAC block material was introduced in 1924 Sweden by John Axel Eriksson. This can be manufactured through material like aluminium powder and a proportionate blend of lime, fly ash, cement and sand.
- AAC contains 50 to 60% of air leading to light weight low thermal conductivity.
- AAC is a masonry material that is light weight economical transport and easy to construct.
- The uses of AAC block reduce the cost of construction up-to 25 %. AAC is used in many buildings constructions such as residential homes, commercial and industrial buildings, school, hospitals.

Conventional Bricks:

- Those bricks which have not been standard in size are called as conventional brick.
- The dimension of conventional brick vary and depend on region and place.
- The conventional brick is 50% heavier than conventional brick.

Techniques to make building earthquake resistance:

There are six types of techniques which we are going to study,

[A] Shape memory alloy:

- The shape memory alloys are made from nickel, aluminium, copper, zinc
- These materials have high strength, Corrosion free, durable and biocompatible

[B] Base isolation:

- These can be used for low medium rise building where soil bed is hard.
- In this method we break the contact between the building and ground. So when the earthquake comes the building remains flexible and does not come under deformation or any effect of an earthquake.
- This method can make building earthquake resistant.

[C] Carbon fiber:

- This method recently used in Japan.
- In this method the building is supported with carbonic fabric material like a spider web on the building.

[D] Prestressed concrete member:

- This method commonly used in making bridges and earthquake-resistant buildings
- These structures are prepared at the specific place where we can control temperature and other effects on concrete which make it more durable and higher strength.
- In pre-tensioning cables are pre-tensioned before casting the member.

[E] Steel plate shear wall:

- In this method, the main components are steel and shear wall. As we know that shear wall is used for lateral load resistance system and steel for high ductility.
- These walls are thinner and lighter in weight which reduce the weight of building.

[F] Seismic damper:

- Seismic dampers are basically shoker used in construction of earthquake resistance building.
- Under the earthquake these are act like hydraulic shock absorb in which the sudden jerks are transmitted into the hydraulic fluid thus reduce the magnitude of the face acting on the building.

2. LITERATURE REVIEW

1. **Abhilash thakur (2022):** In this paper we are see overall study above earthquake resistance structure in this papar we are study in recent innovatin and construction.by researches from all the world attempt in produce cost effective and efficient construction technology.by studing this paper we are known about different techniques to make earthquake resistance building.
2. **A.A. Waghmare (2022):** In this paper we are analyse the earthquake resistance building by using ETBAS software. By studying this paper we are concluded that at the displacement is increasing from first story to last story by analysis the multistory building conclude by structure is safe in loading like dead load, live load, wind load, seismis load.
3. **Prince Yadav (2022):** Structural engineer are mainly concerned with how structure response to horizontal force and suitable stiffness is requied for high rise structure to resist horizontal force include by wind and earthquakes. Shear wall which are place to the interior of the proposed structure are use to counteract horizontal force such as lateral stresses cause by earthquakes and to increses the structure stiffness.
4. **K. SENTHILKUMAR (2022):** In this work multy storey residential building was study for earthquake load using ETAB. In this paper we are concluded that the displacement is increase more than 628 % .
5. **Mr Rajeshkumar yadav (2021):** In this paper we compare ordinary brick wall with different position of shear wall we are conclude that same result can be found the overall conclusion is that if we provide shear wall at inner edges. It will be most effective as compare to another.
6. **Vijay kumar, Dinesh sen (2020):** The aim of this paper is to investigate a high rise building of multifloor by considering seismic dead and live load.by studing
7. **Nikhil Sontakke (2019):** In thia paper they are discuss about to prevent the buildings from earthquake effect.by studing this it was seen that bace shear can be reduce by above 10 to 35% while story displacement can be reduce to 10 to 25 % effectively by providing 3% TMT.
8. **Raja gowhar (2019):** The main goal of earthquake resistance building is to design building that can sustain seismic activity of reasonable magnitude.
9. **D Vivek Varma (2017):** Eathquake is the natural calamity it produced strong ground motion which affect structure. Share wall are install to enhance the lateral stiffness, ductility safety of the structure and minimum lateral displacement.
10. **Mohapatra,A.K.(2010):** In this paper we are studies different seismic zone in India.By discussed this paper there is a clear arjuntly needed to focus research and development public awareness, technical competence enforcement on engineering of earthquake in India.

3. OBJECTIVES

- To known about new and advanced method for earthquake resistance building.
- To compare various analysis result of building under zone 2,3,4 and zone 5 using ETAB software.
- To make structure light in weight hence improve seismic performance.
- To analyse the structure using ETAB software by compairing conventional brick and AAC block.

4. Conclusion

By studying the above review paper we are concluded following points.

1. Its observed that the displacement is increasing from first storey to last storey.
2. By studying the paper it is observed that the storey drift is maximum at zone 5.
3. The weight of AAC block is 80 % less than normal conventional brick.
4. The density of AAC block 1/3 by normal brick.

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