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SEISMIC ANALYSIS OF g+5 BUILDING WITH AAC BLOCKS AND CONVENTIONAL BRICKS FOR DIFFERENT ZONES BY USING STAAD PRO

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Abstract

In order to compete in the ever growing competent market it is very important for a structural engineer to save time. As a sequel to this an attempt is made to analyze and design a multistoried building by using a software package STADD PRO. As STAAD Pro is the current leading design software in the market, many structural designing companies use this software for their project design purposes. So, this article mainly deals with the analysis of the results obtained from the design of a building structure when it is designed using STAAD Pro Software. The software method of analysis is used for a G+5 Residential building with ACC blocks and conventional bricks, located in Zone-III, Zone IV and zone V. In this study two types of infill material used first is brick infill, second is AAC block infill. So there for two types of infill material in which 18 models will be prepared in Staad pro. In this study G+5 storey building is considered for analysis which is located in Zone III, zone IV and Zone V earth quake region. Static analysis is done using Staad pro software, soil conditions is to be medium, Soft and Hardand importance factor is to be taken as 1.2. various parameter studied like lateral displacement of building, axial load in column, Maximum Bending moment and Maximum shear force for a particular beam for all two types of material and for all cases and weight calculations as per code IS 1893:2002.

Key Words: **AAC Blocks, Conventional Bricks, Staad Pro**

1. INTRODUCTION

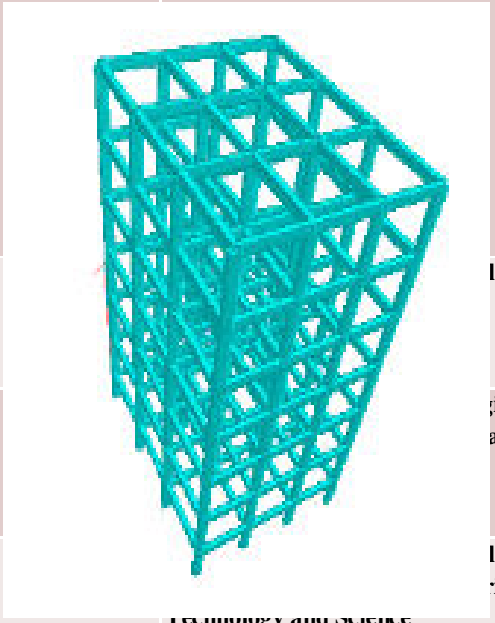
Bricks remain one of the most important building materials in the country. Brick making is a traditional industry in India, generally confined to rural areas. It has directly or indirectly caused a series of environmental and health problems. At a local level, in the vicinity of a brick kiln, environmental pollution from brick-making operations is injurious to human health, animals and plant life. The environmental pollution from brickmaking operations contributes to the phenomena of global warming and climate change. Extreme weather may cause degradation of the brick surface due to frost damage. Various types of blocks can be used as an alternative to the red bricks, to reduce environmental pollution and global warming. Aerated Concrete blocks (AC) may be one of the solutions for brick replacement. AC is one of the eco – friendly product. AC is porous, non-toxic, reusable, renewable and recyclable. Aerated Concrete, also known as aircrete, is a lightweight, load-bearing, high insulating, durable building product, which is produced in a wide range of sizes and strengths. AC is produced out of a mix of quartz sand or pulverized fly ash, lime, cement, gypsum/anhydrite, water and aluminium and is hardened by steam-curing in autoclaves. Being aerated, it contains 50 - 60 % of air, leading to lightweight and low thermal conductivity. AC is a lightweight, precast building material that simultaneously provide fire resistance, construction, economy and speed.

2. Literature Review

Sr. NO.	Title of paper	ISSN NO.

1	**Seismic Analysis and Design of G+9 RCC Residential Building in STAAD.PRO for Zone II Region**	**2347-6710**	**International Journal of Innovative Research in Science, Engineering and Technology**	**Vol. 7, Issue 5, May 2**
2	**Study and Comparison of Structure Having Different Infill Material (Bricks, AAC Blocks and Hollow Concrete Blocks) using ETABS.**	**2394 – 3386**	**International Journal of Engineering Technology Science and Research**	**Volume 4, Issue 12 December 2017**
3	**Seismic Performance of Autoclaved Aerated Concrete (AAC) Masonry: From Experimental Testing of the In-Plane Capacity of Walls to Building Response Simulation**	**1363-2469**	**Journal of Earthquake**	**DOI: 10.1080/136324**
4	**Comparative Analysis of G+10 RCC Building with AAC Blocks and Conventional Blocks**	**2395-0072**	**l of**	**Volume: 06 Issue: 04**
5	**comparison and analysis of multi-storey building in various seismic zones**	**2249-6149**	**ging and**	**Issue 7, Vol. 3 (May 2**
6	**seismic design and analysis of (g+6) residential building in zone 3&4 using staad pro and it's cost estimation**	**2582-5208**	**l of ring**	**Volume:02/Issue:05/**

Slab thickness: 150 mm
Masonry wall thickness: 230 mm Live load : 2 Kn/m^2
Floor finish : 1 Kn/m^2
All the columns are assumed to be fixed at their base.
Characteristic compressive strength of concrete, fck: 25N/mm2 Grade of steel : 500 N/mm2
Density of concrete 25kN/mm2
Modules elasticity of concrete 23500N/mm2
Density of brick masonry: 19.2 KN/m3
Modulus elasticity of brick masonry: 14000N/mm2



3D Plan of Building

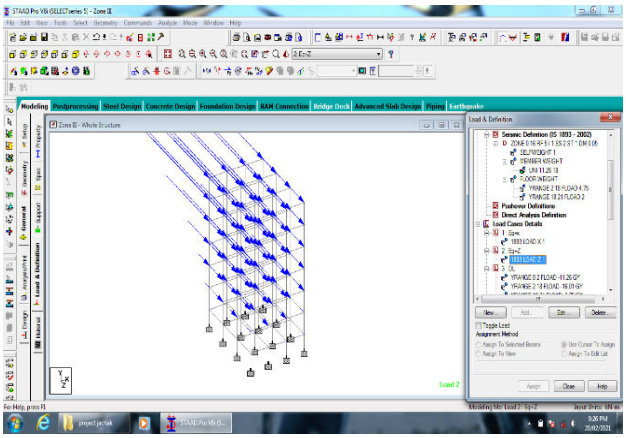
3. SEISMIC ANALYSIS OF BUILDING

Detail of building considered in this work are as follows
Type of structure- Residential building

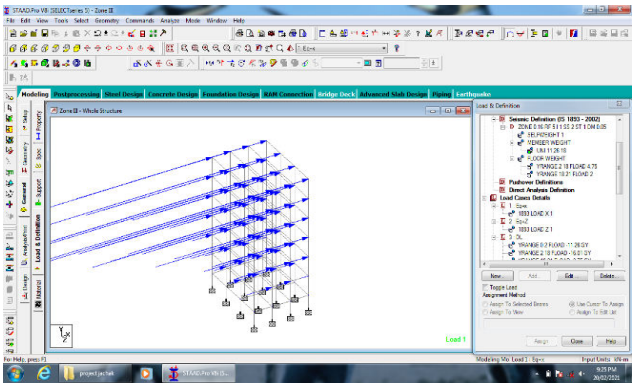
Shape of building – Rectangular building

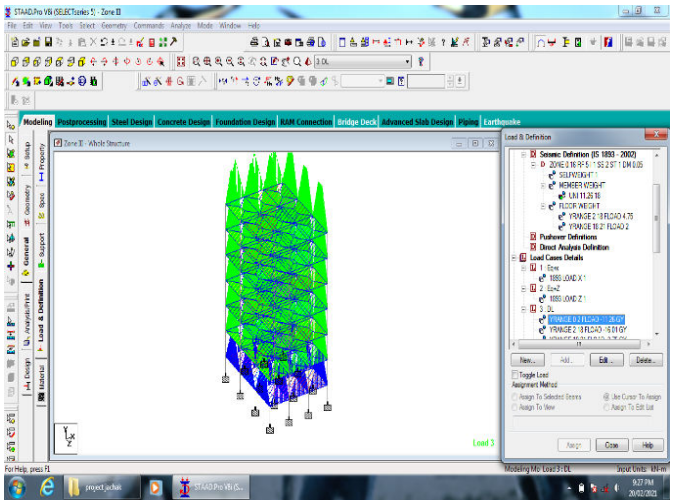
Number of stories 5
Height of typical floor: 3.0m
Column size: 230mm X450mm
Beam size: 230 mm X 450mm

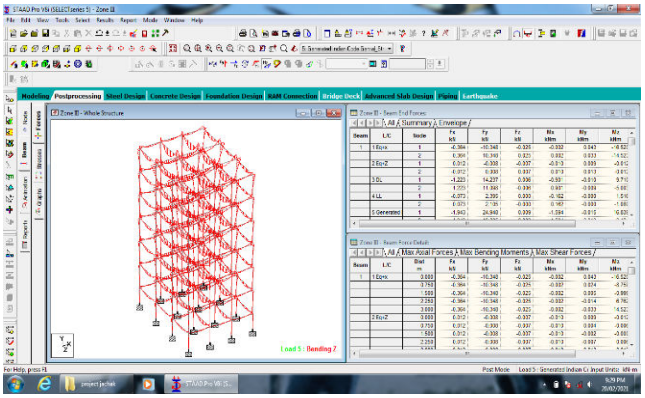
3D Plan of Building

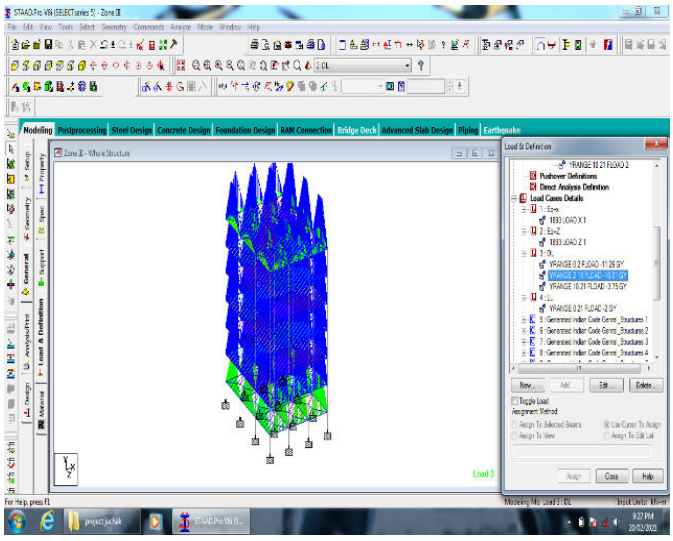


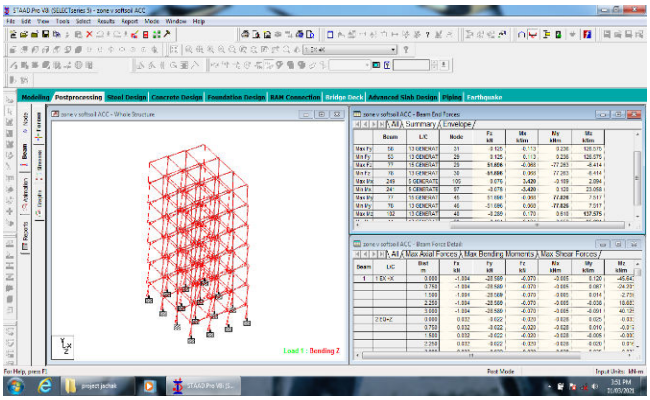
Loding Applied on Building











4. Result and Discussions

The results of G+5 building model are presented in this chapter. The analysis carried out is equivalent static analysis. The result of Lateral displacement, Maximum Bending moment, Maximum shear Force were presented for different seismic zones and different types of soil of India.

5. OBJECTIVES OF STUDY

- The objective of this project is to study the effect of AAC block and Convectional Brick on the seismic behavior of the building.
- To study various effects of AAC and Conventional bricks in the structures various parameters such as lateral displacement, Max. Bending Moment Maxi. Shear force etc. are studied.
- To Compare the Staad pro results for the following parameters such as Maximum Shear force,Maximum bending moment etc.

6. RESEARCH METHODOLOGY

- Study various literatures related to codal comparison of structure.
- Selection of structure and modelling in STADD-PRO.
- Modelling of two structures in STADD PRO according to IS 1893:2002.
- Design of structure as per required IS code.
- Comparison of results for both the models will done to check the effect on seismic response of structure.

7. REFERENCES

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