

Seismic Analysis and Design of G+5 Storied Residential Building Using Stadd Pro

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ABSTRACT: From past earthquakes it is proved that many of structure are totally or partially damaged due to earthquake. So, it is necessary to determine seismic responses of such buildings. There are different techniques of seismic analysis of structure. Time history analysis is one of the important techniques for structural seismic analysis generally the evaluated structural response is non-linear in nature. For such type of analysis, a representative earthquake time history is required. In this project work seismic analysis of RCC buildings with mass irregularity at different floor level are carried out. Here for analysis different time histories have been used. This paper highlights the effect of mass irregularity on different floor in RCC buildings with time history and analysis is done by using STAAD Pro software.

KEYWORDS: SEISMIC ANALYSIS, HIGH-RISE BUILDING, RESPONSE SPECTRUM METHOD, ZONE FACTOR, WIND LOADS, DESIGN LOADS, HIGH RISE BUILDINGS, BASE SHEAR, STOREY SHEAR, STORY DISPLACEMENT.STAAD PRO.

I. INTRODUCTION

The earthquake causes vibratory ground motions at the base of the structure, and the structure actively responds to these motions. In design system, it is customary to assume the structure as a fixed base system acted upon by inertia forces. Seismic design involves two distinct steps. Determining or estimating the structure forces that will act on the structure. Designing the structure to provide adequate strength, stiffness, and energy dissipation capabilities to withstand these forces. Day to day variations in the designing of the structures we were motivated to deal with this project. As civil engineering is much concerned with different designs to meet the necessity of human life we took this project.

II. OBJECTIVES

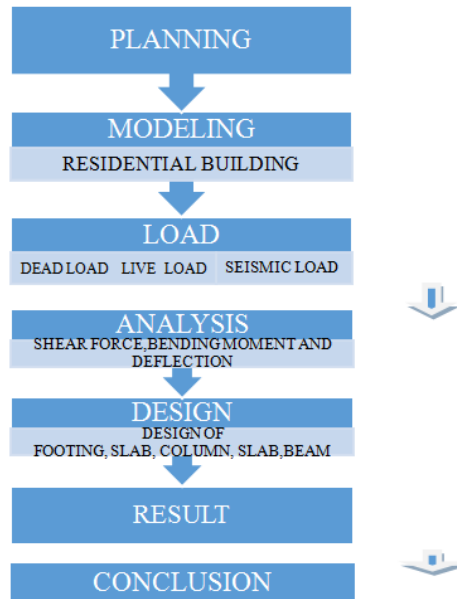
To analyse and design G+5 storied residential building by using STAAD Pro,

- Analysis of G+5 Storied RCC Framed Structure without Seismic Load
- Analysis of G+5 Storied RCC Framed Structure with Seismic Load
- Design of G+5 Storied RCC Framed Structure with and without Seismic Load
- To Compare benefits of Analysis and Design of Building Considering Seismic Effect.

III. METHODOLOGY



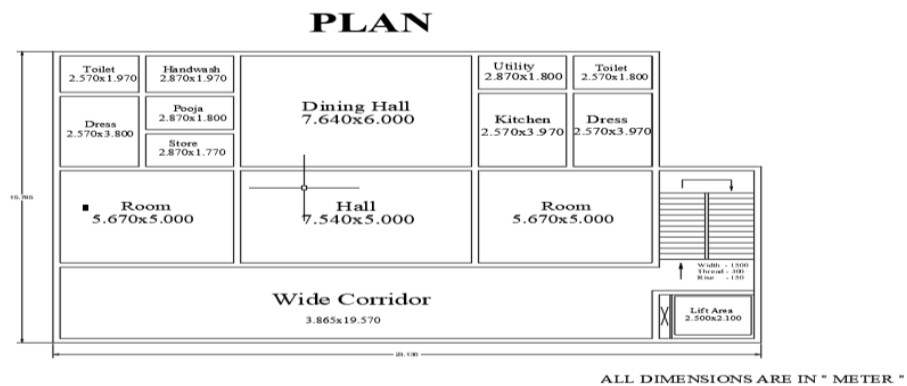
The process carried out by following steps



This Method is step by step analysis of the seismic responses of a structure to a specified loading that may change with time.

STEP 1: PLANNING

Planning is the pre-production activity in Civil Engineering and it involves drawing up construction plans using AUTOCAD Software.



Column	0.5 m x0.5 m
Beam	0.45 m x0.45 m
Slabs	0.15 m
parapet wall	0.1 m
Grade of concrete	M 25
Grade of steel	Fe 500
No. of storey	G+5
Total height	18 m
Height of floor to floor	3 m



STEP 2: MODELING

Using residential building

STEP 3: LOAD

Dead Load: In accordance with IS:875 Part I

Self weight = -1 kN/m²

Slab load = 0.15x25=3.75 kN/m²

Wall load

Outer Wall =0.23x3x20=13.8 kN/m²

Inner Wall =0.115x3x20=6.9 kN/m²

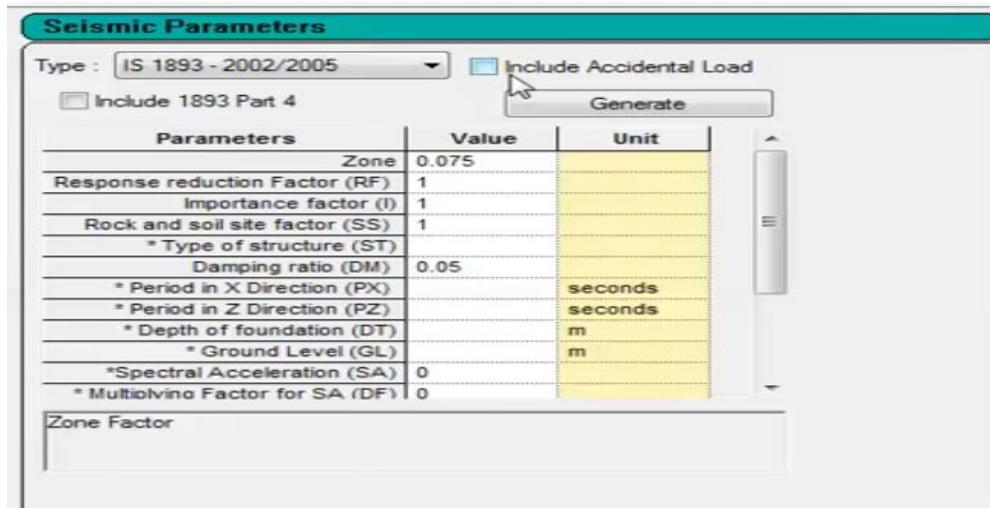
Parapet Wall =0.115x20x1=2.3 kN/m²

Live load: In accordance with IS:875 Part II

Live load of slabs - 3 KN/m²(1-5th Floor)

Live load of Roof - 1.5 kN/m²

Seismic load: In accordance with IS:1893

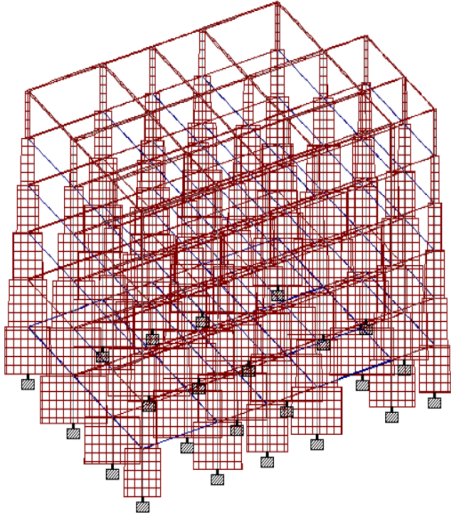


STEP 4: ANALYSIS

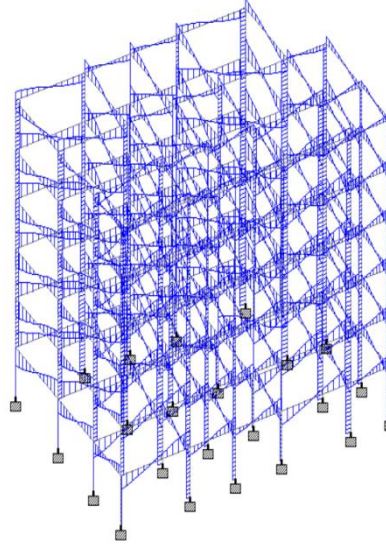
AXIAL FORCE: The force acting along the axis of the component Ex:- Building Column

SHEAR FORCE: Movement of one surface of a substance over another parallel surface

AXIAL FORCE



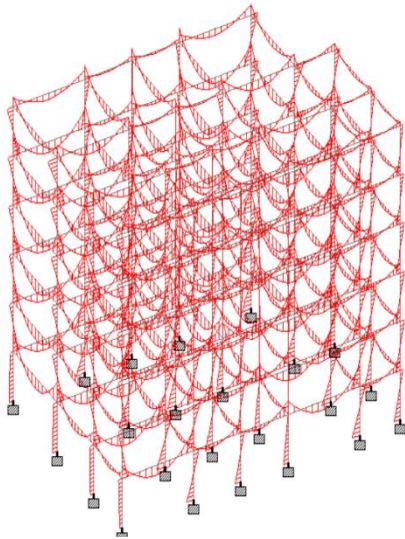
SHEAR FORCE



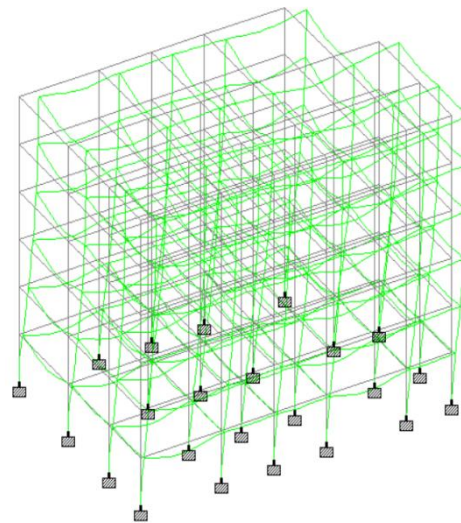
BENDING MOMENT: It is reaction external force or moment is applied to the Structural elements

DEFLECTION: The degree to which a structural element is displaced under load (Turing side)

BENDING MOMENT

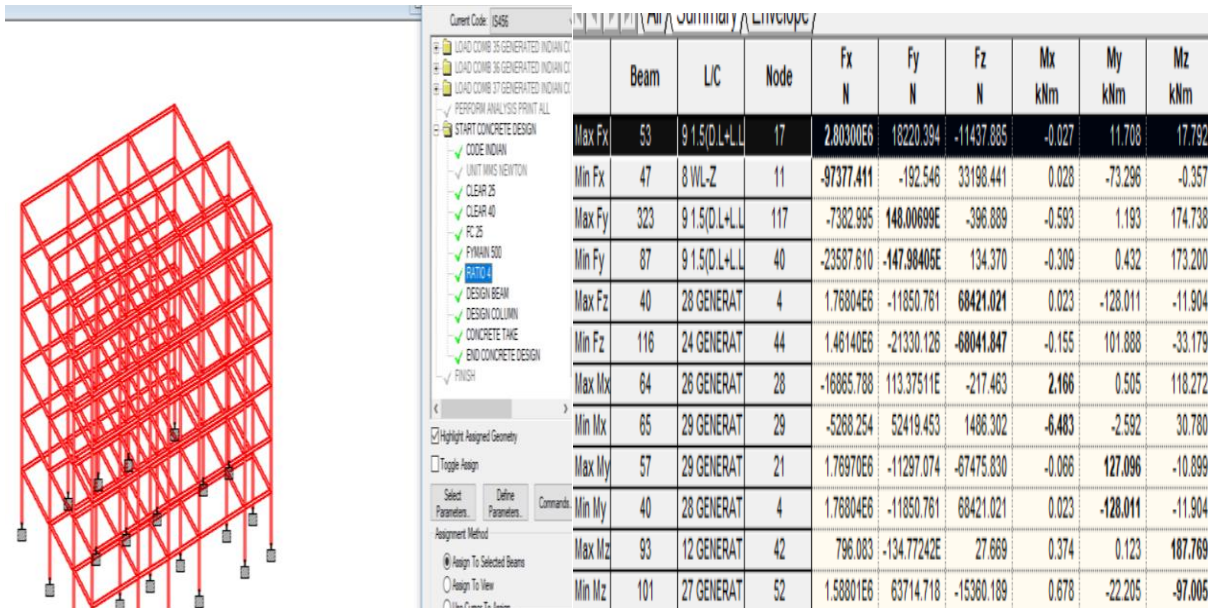


DEFLECTION

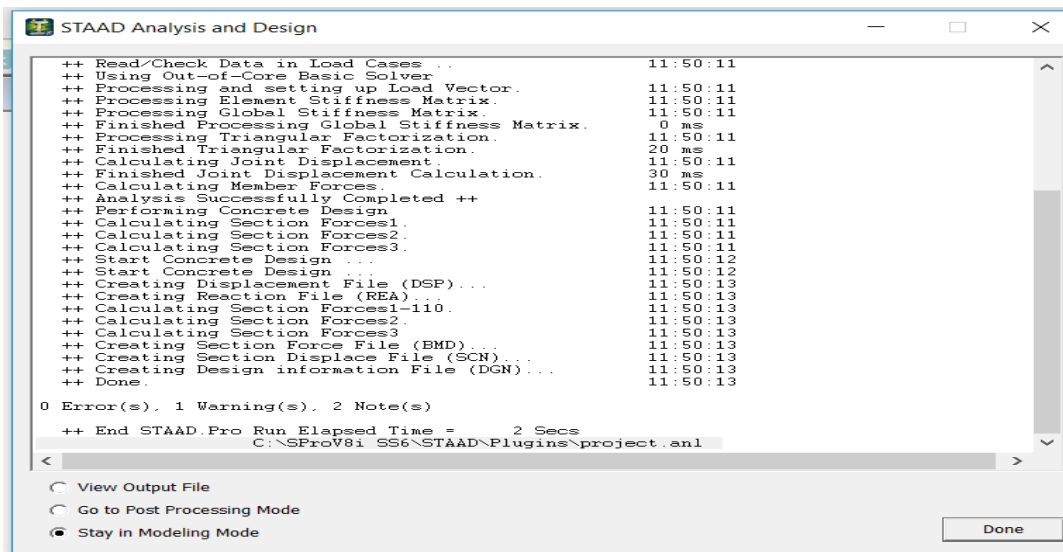


STEP 5: DESIGN

Design of Slab, Column and Beam



STEP 6: RESULT



STEP 6: CONCLUSION

1. Accuracy is Important by Using software
2. Designing using Software's like Staad reduces lot of time in design work.
3. Details of each and every member can be obtained using staadpro.



4. All the list of failed beams can be Obtained and also Better Section is given by the software

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