STRUCTURE ANALYSIS AND DESIGNING OF COMMERCIAL BUILDING BY USING THE APPROCH OF SIMULATION

Dhirendra singh jaddon
M.Tech Construction Engineering & Management
Suresh gyan vihar university
Jaipur (Raj.) india

Abstract: It is proved that a well- plan and designed hotel or any building can be a source of profitable operation but the evidence for this is far from conclusive. This dissertation considers the nature of "good" design and its potential link to higher safety and gets large profit. The concept behind of hotel product lifestyles and two main techniques of space utilization are proposed, the planning factor and the design techniques factor. Including all tables, drawings and plans that describe how these techniques can work in real practice. Various load data are necessary to carry out the seismic analysis and safe design analysis of the structures in this study the seismic response of the structures is investigated under earthquake excitation expressed in the form of member forces, joint displacement, support reaction and story drift. The response is investigated for g+2 building structures by using STAAD PRO designing software. We observed the response reduction of cases Ordinary moment resisting frame. In this case, we have taken earthquake zone 2, response factor 3 for Ordinary moment resisting frame and importance factor 1. Initially, we started with the designing of simple 2-dimensional frames and manually checked the accuracy of the software with our results. Then according to the specified criteria assigned it analyses the structure and designs the members with reinforcement details for G+2 residential building RCC frames.

Keywords: Design analysis against various loads Seismic Analysis, , Ordinary Moment Resisting Frame, Member Forces, Joint Displacement, Support Reaction, Storey Drift, Staad Pro V8i.

INTRODUCTION

1.0. GENERAL:

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. Structure design involves two distinct steps:

a) Determining or estimating the structure forces that will act on the structure
b) Designing the structure to provide adequate strength, stiffness, and energy dissipation capabilities to withstand these forces.

1.0.1. MOTIVATION

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.

1.1 OBJECTIVES OF PROJECT:

Determine the complete design and safe sizes of all building component like beam, column, slab. Find out real life experience with the support of engineering terms and practices. The structure (building) should be so arranged that it can be easily transmit all kind of loads like dead, wind and imposed loads in a direct way to the footings. The arrangement should be ensure that structure we have design that will not collapse progressively under the effects of wrong use or accidental damage to any one element.

LIMITATIONS OF PROJECT

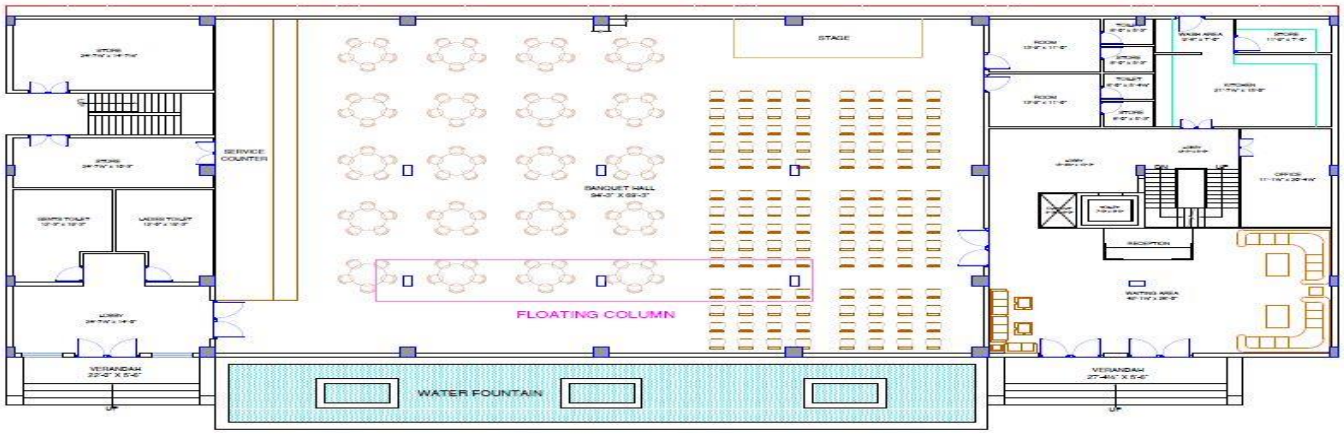
- Depending on the site area the number of floors is limited.
- Designing is completely based on IS-456 IS 875 codes.
- If once the structure is designed for one purpose it cannot be used for another purpose if the load acting on it is increased than the designed.

TYPES OF SOIL:

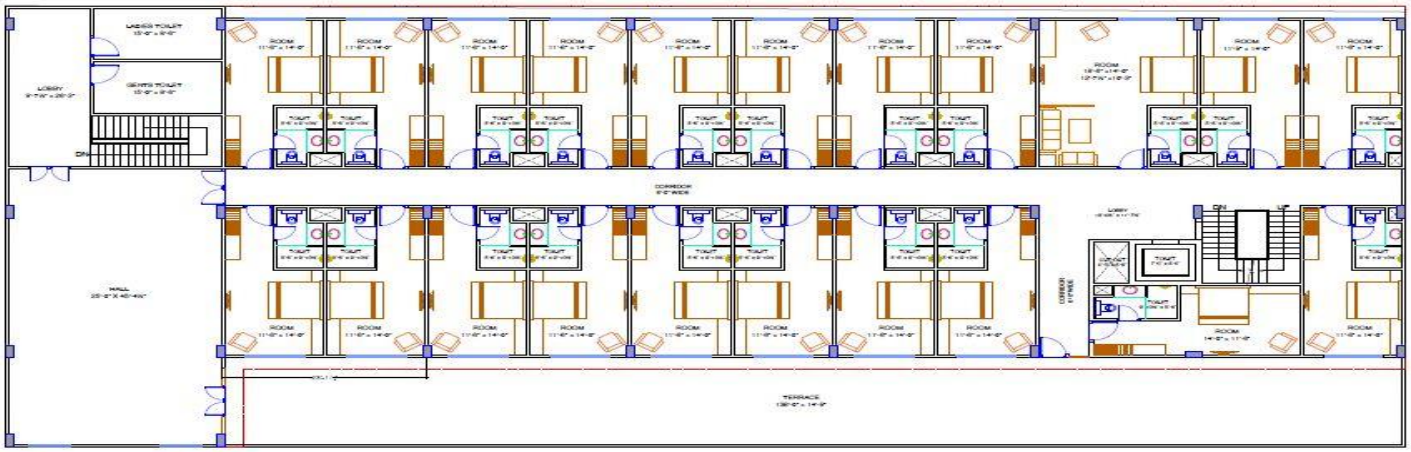
The soil stratum is M: Silty soil
The spt "N" value indicates that soil stratum is medium dense soil.
Soil is no plastic and not having cohesive.

STATEMENT OF THE PROJECT:

- Live Load: 3.0 KN/Sq.m
- Thickness of slab: 120 mm
- Location of the site: Hyderabad in Seismic Zone-II
- Type of Soil: Medium Dense Soil, (Type-II as per IS: 1893 (Part-1))
- Allowable bearing pressure: 150 KN/Sq.m
- Each Storey Height: 3.3 m
- No of Floors: Ground+2
- External Wall Thickness: 230 mm
- Internal Wall Thickness: 120 mm
- Column Size: 450mmx450mm, 450mmx300mm
- Beam Size: 300x600 mm, 450x900 mm, 230x450 mm
- Wind Load: As per IS: 875-1987 (Part-3)
- Earthquake Load: as per IS: 1893-2002 (Part-1)



GROUND FLOOR PLAN



FIRST FLOOR PLAN

4.3 LOADS

Introduction

The RCC structure resists the following types of loads.

Dead load

Dead loads are permanent or stable loads which are fixed in the structure throughout their life span. Dead loads Causes due to own weight of structural members, permanent partitions, fixed equipments etc.

Load calculations-

SELF - WEIGHT OF SLAB LOAD:

Floor loads for 150mm thick slab

Thickness of slab -150mm

Unit weight of reinforced concrete - 25.00kn/m3

0.150 x 1x 25

$= 3.75$ KN/m^2

Self weight of slab $= 3.75$ kn/m^2

Floor finishes of slab $= 1.00$kn/ m^2

Total load of slab $= 4.75$ KN/m^2

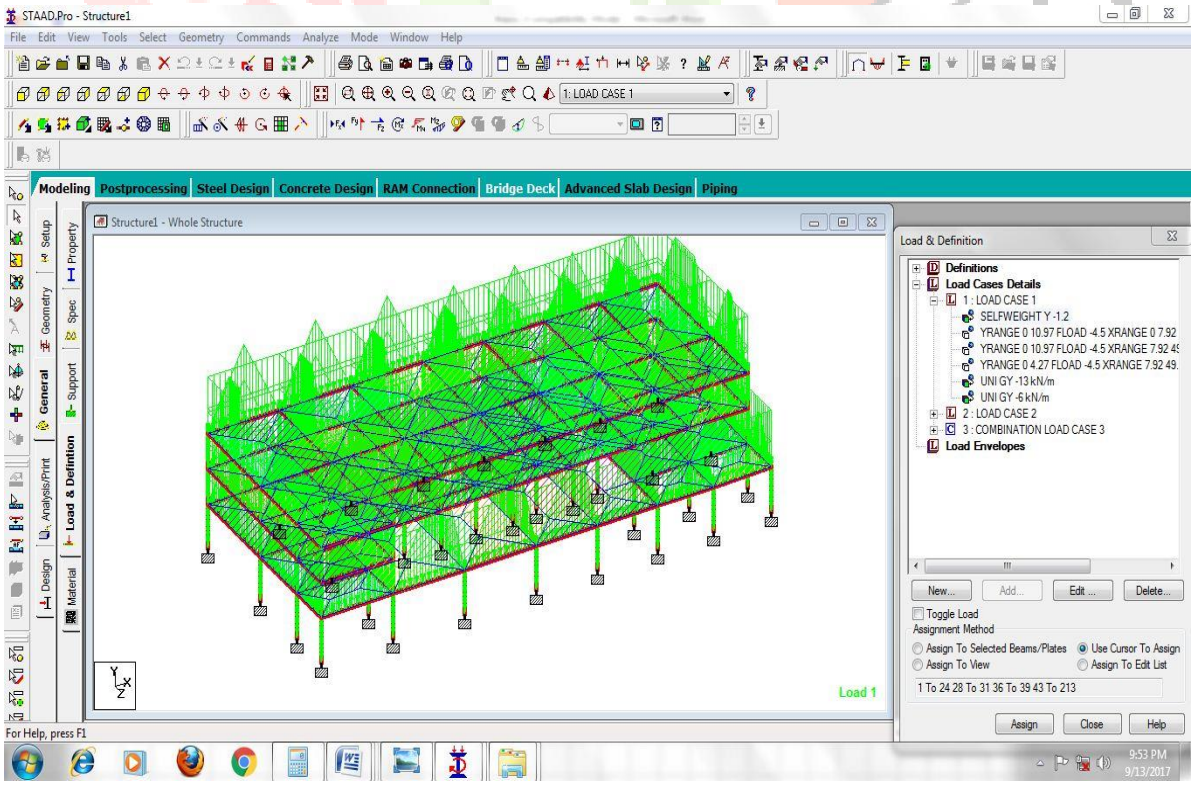
Self weight of beam load:

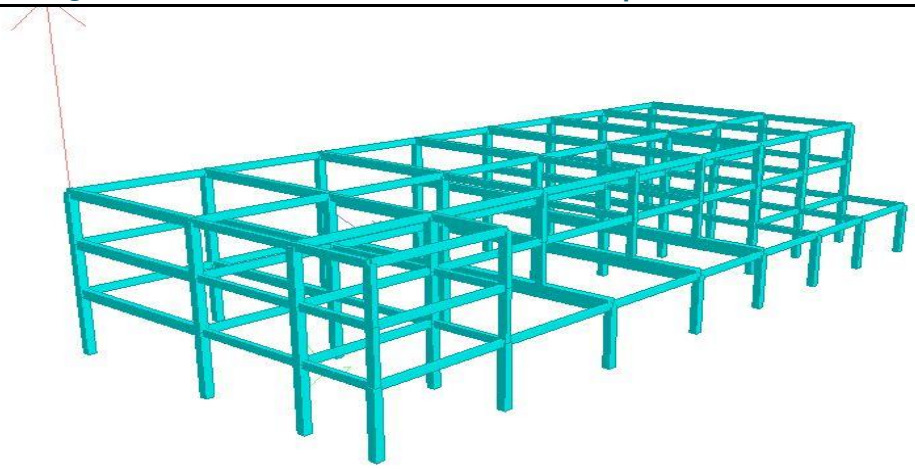
Beam Size- 600mmx300mm

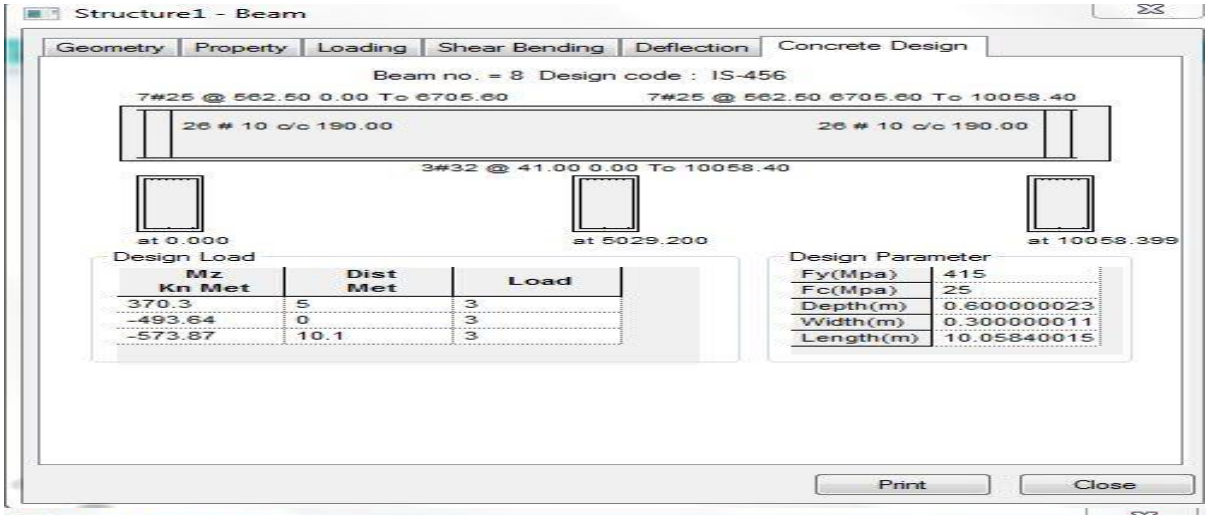
Unit weight of reinforced concrete = 25 kn/m3

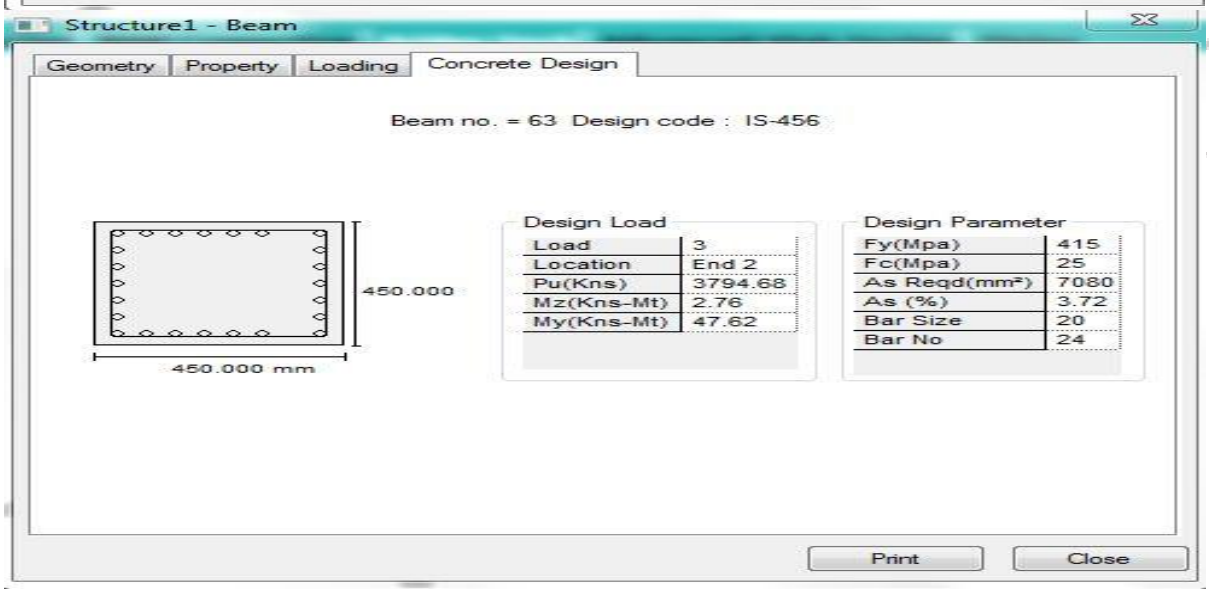
$=$ 0.3 x 0.6 x 25

$=4.5$Kn/m^3









TEXT BOOKS

- LIMIT STATE DESIGN OF REINFORCED CONCRETE: P.C VARGHESE
- DESIGN OF STEEL STRUCTURES: S.S.BHAVIKATTI
- THEORY OF STRUCTURES: B.C.PUNMIA
- DESIGN OF SLABS: Dr. G. P. CHANDRADHARA

IS CODE BOOKS REFERRED:

- IS RCC CODE 456-2000
- IS CODE 4326 (part-I)-1993 EARTHQUAKE RESISTANCE
- IS CODE OF HYSD 1786-1985
- IS CODE OF LOADS 875 (part-1, 2, 3)-1987