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A Review on Seismic Analysis of Different Slab System in RCC Multistory Building

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Abstract- Seismic Analysis is a part of structural analysis and is the calculation of the response of a building structure to earthquake. In today's construction the use of flat slab has become quite common. A flat-slab building structure possesses major advantages over traditional slab-beam column structures because of the free design of space, shorter construction time, architectural–functional and economical aspects. The need for a simple method to predict the static behavior of a structure under seismic load. it is primarily important. It can help demonstrate how failure in building actually occurs, and identify the failure pattern of structure.

Key Words: Seismic Analysis, Flat slab, Conventional Slab, Waffle Slab.

I. INTRODUCTION

Seismic Analysis is part of structural design, earthquake engineering where earthquakes are prevalent. In seismic analysis there are different procedures i.e. linear static analysis, non linear static analysis, linear dynamic analysis, nonlinear dynamic analysis. In linear static analysis again there are four methods Equivalent static method, Displacement based method, Energy based method, and Capacity based Method. And Push over Method is in non linear static analysis .In linear dynamic analysis again there are two methods response spectrum method, linear time history method. Non linear time history method is a type of non linear dynamic analysis. In The seismic analysis type that should be used to analyze the structure depends upon External Action ,The behavior of structure or structural material, The type of structural model selected. A reinforced concrete slab is a crucial structural element and is used to provide flat surfaces (floors and ceilings) in buildings. The slab may be supported by walls or by reinforced concrete beams usually cast monolithically with the slab or by structural steel beams or by columns, or by the ground. Slabs are classified into…

Flat Slab:

A reinforcement Concrete Slab, supported with column without use of beam, also it is called as beamless slab, is a supported directly by columns without beam.

Types of Flat Slab-

a) Flat Slabs With drops
b) Flat Slab without drop and perimeter beam
c) Flat Slab with drop and perimeter beam
d) Flat Slab without drop

Waffle Slab:

Waffle slab is a reinforced concrete roof or floor having square grids with deep Sides. These type of slabs mostly preferred in construction with intense strength to weight ratio greater than 12m span waffle slab is preferred.

Types of Waffle Slab-

a) Waffle Slab without drop
b) Waffle slab with Drop

A slab deck is one where the deck is analyzed as a plate. If the slab has a stiffness that is different in two directions (at right angles), then

the deck is known and analyzed as an orthotropic deck.

II. LITERATURE REVIEW

1. Mohan H.S., Kavan M.R.(2015)

This paper provides a study of Flat slab and conventional slab structure. In this dissertation work multi-story building having flat slab and conventional slab were analyzed for different parameters i.e. base shear, story drift, axial force, displacement. It also gives information about suitability of flat slab for various earthquake zones without compromising the performance over the conventional slab. In this work the storey shear of flat slab is 5% more than conventional slab structure, the axial forces on flat and conventional building are approximately 4mm in each floor.

2. Deressa Ajema, Ameyu Abeyo (2018)

research on "Cost Comparison between Frames with Solid Slab and Ribbed Slab using HCB under Seismic Loading." present results of a research project in Ethiopia for the Frames with Solid Slab and Ribbed slab in the same seismic zone (Zone-4) and on the same Soil class or type (soil type A). Excel Design Template carries the design of Frame with solid slabs. The methodology employed in this study consists of two parts; the first part is the analysis of structure for the data taken from standard code by using STAAD Pro 8.1 software. The second part is the design of structure which is carried out by manual calculation and Excel Design Template.The result obtained from the study shows that the Frame with Solid Slab has right Bending, Shear and Storey deflection resistance capacity making it more preferable choic for shopping /commercial (superstructure) building.

3. Raunaq Singh Suri, Dr. A.K. Jain

research on "A Comparative Study of Flat Slab with Perimeter Beams and Conventional Slab Structures under Seismic Conditions." This paper focuses on the comparative study of conventional slab structure to flat slab structure having perimeter beams. In this study, ETABS software is used for the analysis of different structures in Indian seismic zones III, IV and V having 10, 12 and 15 storey's. The models taken in this study have Rectangular and L shape configurations. On the basis of the analysis results, the paper discusses the distinctions of structure's behavior under different heights in terms of maximum reaction, maximum storey displacement, maximum overturning moments and maximum storey drift.It shows that if we increase the height of the structure from 10 stories to 12 stories as well as from 12 stories to 15 story, observed value increases by an amount of 20% and 25% respectively in both Conventional and Flat Slab structures having Perimeter Beams.

III. METHODOLOGY

1. Study of different flat system and their applications.
2. Analysis and design of different slab system using codal provision.
3. Seismic analysis of different slab system for multistory building using finite element based software.
4. Comparison results of different slab system

IV. CONCLUSION

From the available literature it was observed that most of the studies are on the seismic analysis of slab system of two/three system of slab and results are used for comparison are limited to define seismic performance of slab system. Only a limited number of published works on multi-story different slab system to find out the performance level buildings. Thus, after

reviewing the existing literature it was felt that a comparative study on multi-story buildings for different slab system, analysis is required.

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