

# Conceptual Approach on Effect of Various Concrete Grade in Outrigger and Wall Belt Supported System: A Perceptual Review

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**Abstract**— This paper briefs concerning purpose the effect of different grades of concrete which is used in building where outrigger and wall belt supported system with the help of analytical method by design software. In this paper also brief the effects of earthquake and non-earthquake actions of multistory building with different grades of concrete discussed in connection with outrigger and wall belt support system. The major principle of the review work is to study the effect of different grades of concrete in outrigger and wall belt support system multistory buildings in the view of various researchers. The study can also be useful for low as well as high seismic prone areas as well. The software analysis also been referred for the analysis in the research field. This study deals with the comparative analysis of the research trend on the current topic and after the survey, comprehensive outcomes are provided in conclusions that forms the objectives of the further upcoming study.

**Keywords**— Concrete grades, Outrigger, Perceptual review, Seismic analysis, Wall belt supported system.

## I. INTRODUCTION

In this era there are many multistory buildings that are constructed throughout the world. In the current circumstances of excess numbers of people and growing trend of lavish and attractive way of life in the quick rising nation, the structure sector faces new challenges gradually particularly the structural engineers to accomplish the dreams. To complete such type of require a variety of researchers have ended a lot of job and a lot fresh techniques are developed for every new generated trouble comprise of bracings, outriggers, RC shear wall and shear core, steel plate shear walls, box systems, base isolation, dampers, seismic invisibility cloak, rocking frame, etc. One of the answer adopted for our study for such type of troubles is outrigger system or we can say the appliance of this system i.e. use of shear wall belt at best height to make the construction competent of managing lateral loads developed due to seismic forces or may be due to wind effects in case of high rise building or twin tower or skyscrapers as per the need of hour. Here to face a lot of study work is done in the field of lateral load resisting system where a variety of such kinds of systems are analyzed next to a variety of constraints unconnectedly for specific circumstances and limitations. Shear wall and shear core both are optimized within the building against a variety of parameters but the use of shear wall as shear wall belt like outrigger beam system is not analyzed till now.



Fig.1: Multistory Building



Fig.2: Multistorey Building

## II. MULTISTOREY BUILDINGS

The paper is concerning various analytical approach for multistorey building by consider seismic and non-seismic performance on multistorey buildings. Also to find out the effect of different grades of concrete in outrigger and wall belt support system multistorey buildings, till now, the design software has been used in the analysis. By using this scheme and analysis we can effortlessly find out the effect of different grades of concrete in outrigger and wall belt support system multistorey buildings. it is actually vital analysis for multistorey buildings because a lot of the multistorey building are constructed in earthquake zones and several exclusive of earthquake zones so this analysis is significant for both. And it also can compact the expenditure of manufacture by knowing its consequences.

### Outriggers:

Outriggers are the combination of members of beams or plates linked from the core to external columns in both the directions that hold the structure and act as frame connections. The core provided such as shear wall core holds the whole construction resolutely that accepts the loads and transmit the loads uniformly to the external columns. This system provides more rigidity to the structure than conservative frame systems.

### Belt supported system:

The mainly proficient system used in high rise building is the bracing system moreover it is wall belt or truss belt system. This system is the link of the members to the nodes of the construction. It is called as belt supported system because the belt usually made up of trusses or shear wall, connects the outside edge columns of the construction. The load moves from each member spread to the connected construction equally.

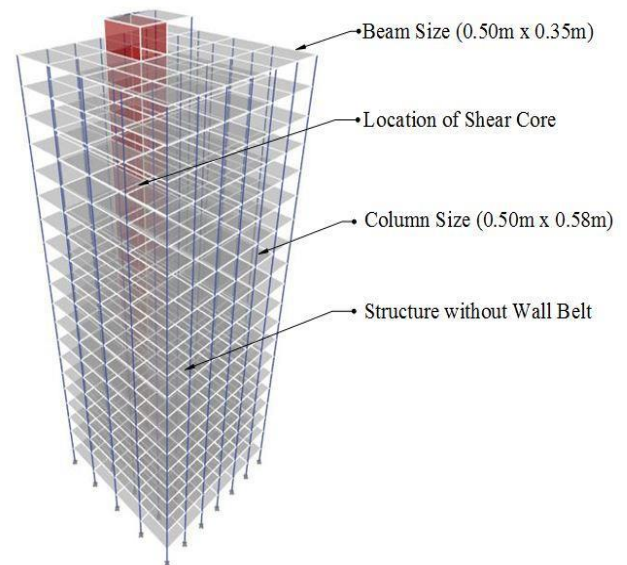


Fig.3: Structure without Wall Belt

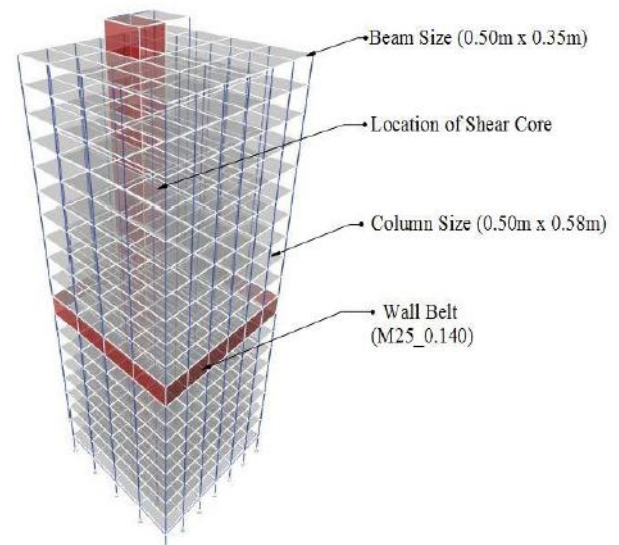


Fig.4: Structure with Wall Belt

## III. LITERATURE REVIEW

In this paper researcher analyze the stability of twins floor of 12<sup>th</sup> floor and its effects on twins tower buildings during seismic effect. It is so significant to verify all probable seismic loadings and performance of reinforced concrete Because of it help to design the construction system and also to oppose seismic effects. Seismic load effects have also a significant factor in all type of usual building counting skyscrapers (Neeraj Patel et. al.).

The paper briefs about structure using shear core outrigger, wall belt and truss belt systems. Base Shear show smallest amount response value other than common construction which seems very proficient under seismic result is Regular structure with shear core. Overall revision said that Wall belt system is more efficient than truss belt

system which has seen in this exertion (Archit Dangi et. al.).

The paper state that In the This study is based on the use of shear belt at optimum height in multistory building. By exploring many research papers, it is highly recommend increasing lateral load handling capacity when considering tall structures. Expected conclusion to optimum height in multistory building with using shear belt (Neeraj Patel et. al.).

This paper includes use of response spectrum in with and without opening dual configuration multistoried building also comparing with five other different building to analyze efficiently it is found from study that when there will be excess use of opening beyond the 20% limit, the stiffness of the structure will be less and the structural component will be fail (Prafoolla Thakre et. al.).

Shear walls provide strength to the structure. Because of its importance we used it in high rise buildings. The buildings are of different-different shapes and different-different sizes which affect its strength with respect to seismic loads. Therefore a study and analysis is done on the safety of buildings against seismic loading and how shear wall helps to resist the seismic loads (Prafoolla Thakre et. al.).

From the review of this paper it was observed that several papers are presented in shear wall opening against various constraints such as location of shear wall, size and shape of the shear wall etc. In most of the papers presented major portions of work is done toward the seismic parameters and are modeled for regular shaped building with rectangular plan only. Nowhere the analysis is done for opening in shear wall in Re - Entrant corners of the building along the height of building to accommodate the current population fit with appealing architecture and with safety (Prafoolla Thakre et. al.).

Now days to improve the strength of concrete there are many methods and new techniques available. Use of waste material is one of them silica fume, fly ash, blast furnace, steel slag is one of them. They also used as additional cementitious materials. The most popular and successful material is silica fume because of its property to increase the strength of concrete. It improves concrete tensile and flexural strength. In this research the cement is replaced by silica fume and many tests is done to find out the strength of concrete (Prabhulal Chouhan et. al.).

It is necessary now to strengthen concrete for the construction work. The concrete should be high in strength and durability. To increase its strength and durability a research has been done. In this research cement is replaced by polyethylene glycol-400 at different-different

percentage and the results show that it gives more strength than concrete (Prakash Mandiwal et. al.).

Researcher state that for improving the concrete using PEG-400. It shows, it gives more strength than concrete. Determine the tensile strength & durability of concrete using PEG-400. To conclude the results of tensile strength & Durability of conventional concrete & self-curing concrete (Prakash Mandiwal et. al.).

The researcher state that their studies analyzed with the different parameters of design software model with different grades like stresses displacements base shear etc in longitudinal and transverse direction. After this, the most efficient grading will be analyzed after all parameters. There are total 5 grades of structure multistoried building at medium soil condition under seismic forces for earthquake zone III exist (Mahendra Kumawat et. al.).

This paper summarizes that it is really important to use analytical methods before construction of multistory buildings in seismic and non-seismic areas. By reviewing all the papers we can easily understand the importance of analytical methods. We can easily calculate the effect of seismic loading by using the software's like Staad pro and E-tabs before construction of multistory buildings. Calculation and modeling is the main purpose of the conclusion (Abrar Ahmad et. al.).

#### IV. CONCLUSIONS AND OUTLINE OF PROPOSED WORK

As per the conduction of literature survey, following conclusions are evolved:-

1. This paper state that the importance of different grade of concrete for the enhancement of performance of concrete structure.
2. This paper also summarizes that the outrigger and wall belt support system is making efficient structure by using the technology.
3. The effect of different grade of concrete in outrigger and wall belt supported system should also consider.
4. Dual structural system should make an extra effort in making the grade change of concrete.
5. The structural efficiency should also been taken into account.

The main focus is to check the dual system with different grades of concrete in Outrigger and Wall Belt Supported System that has going to be a major study for upcoming proposed work.

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