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Analysis of Multistoried RCC Building with Shear Wall and Outrigger using ETABS Software

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Abstract: ***During earthquakes, a large number of buildings are destroyed due to the cause of lateral forces and increased load capacity in the structural element, and this is caused by winds, earthquakes and uneven settlement of cargo. The least damage and well-being a healthy level of construction is a necessary requirement for tall buildings. To reduce the impact of damage on all high structures, it may consist of basic insulation techniques and sliding walls, and so on. Buildings are used to increase design performance and limit damage to landslide walls. On tall buildings to prevent earthquake loads, reinforced concrete walls are used as supporting elements. Reinforced concrete structures are mainly implemented in engineering practice in different situations and different applications. Many researchers turn to the effectiveness of sliding walls with boundary conditions based on different types of reinforcement alignment. This document consists of modeling different models for the shear wall housing and the hood system.***

Keywords: Outrigger, Shear wall, Lateral Displacement, Storey Drift & Storey Shear

I. INTRODUCTION

Reinforced concrete wall is designed as an element of compression. Reinforced concrete wall is a structural element used to resist lateral forces, ie. parallel to the plane of the wall. These are vertical elements of horizontal force that resists and resists loads through the cantilever action.

These RC walls are used in case the beam is not provided and the load from the plate is heavy or when the thickness of the wall is limited, and in this the load from the plate is transmitted as an axial load on the wall. There are still restrictions on the full reproduction of the actual seismic behavior of structures. There are some simplifications that are currently in use to effectively address the project of buildings. These simplifications become even more relevant due to their many possible cross-sections (for example,., T, L or C forms).

Major scientific efforts have focused on carrying out their work on reinforced concrete walls with boundary elements with normal conventional and diagonal reinforcement. Determining the seismic response of sliding walls without border elements and changing the alignment of reinforcement types is the topic of modern research. [1] Modeling of the analysis of light weight concrete walls of shear is presented, and in this analysis a revised manuscript was obtained on April 9, 2019. K. Krishna frame, GHG student, Department of Construction, Koneru Lakshmay Education Foundation, Guntur, India.. Lingeshwaran Nagaratinam, Associate Professor, Department of Civil Engineering, Koneru Lakshmay Education Foundation, Guntur, India. for light weight of concrete sliding walls, storing fittings in four different ways. ANSYS 8.0 was used to numerically study lightweight reinforced concrete landslide walls, and these numerical results were compared with experimental results, and they said that diagonal web amplification is effective in transfer shift of force to the foundation.

II. REVIEW OF LITERATURE

There are various authors who have worked on autrigger systems, some of which and their work are discussed below :

Texas R. M. etc. etc. (2015) conducted a comparative study and analysis of various structural systems, resisting the lateral load, to understand the realistic performance of the building during the earthquake and under excessive wind pressure, and select the structural system of the tall building, to remain in good condition with effect, gravity, live load and external lateral load, moment, force and shear torque with acceptable strength and rigidity.

Alpana L. Gawate et.al. (2015), research has focused on increasing the lateral rigidity of all buildings, as the height of the building increases only the core, is not sufficient to maintain drift within the allowable limit. Therefore, some other structural element should be added to this building to take care of drift.

III. MODELING

In the present work the shear wall thickness is considered as 230 mm, the building considered as total of 30 storey building. The three models are considered for modeling:

1) Model-I: Building with Shear Walls Outrigger system is connected with Core at 1/3rd height
2) Model-II: Building with Shear Walls Outrigger system is connected with Core at mid height
3) Model-III: Building with Shear Walls Outrigger system is connected with Core at top.
4) Model-IV: Building with Shear Walls Outrigger system is connected with Core at top.
5) Model-V: Building with Shear Walls Outrigger system is connected with Core at top.

IV. RESULTS

The analysis is carried out in ETABS software and the results in terms of storey drift, storey shear, time period is obtained as follows.

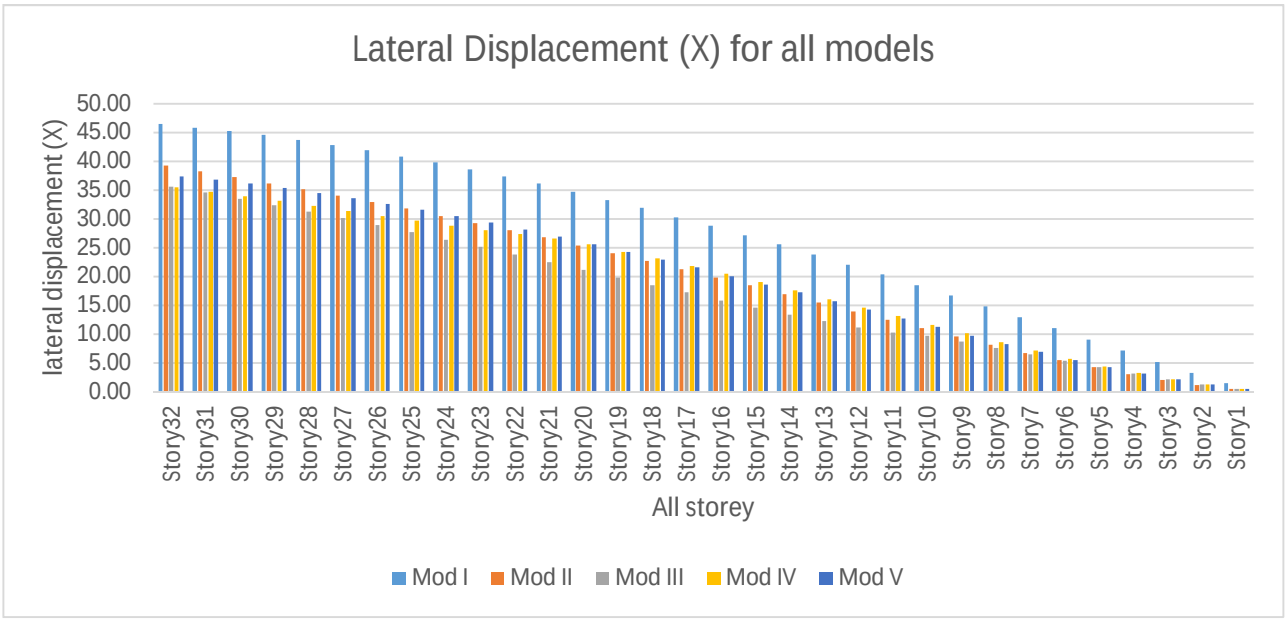

Fig.1: Lateral Displacement (X) for all models

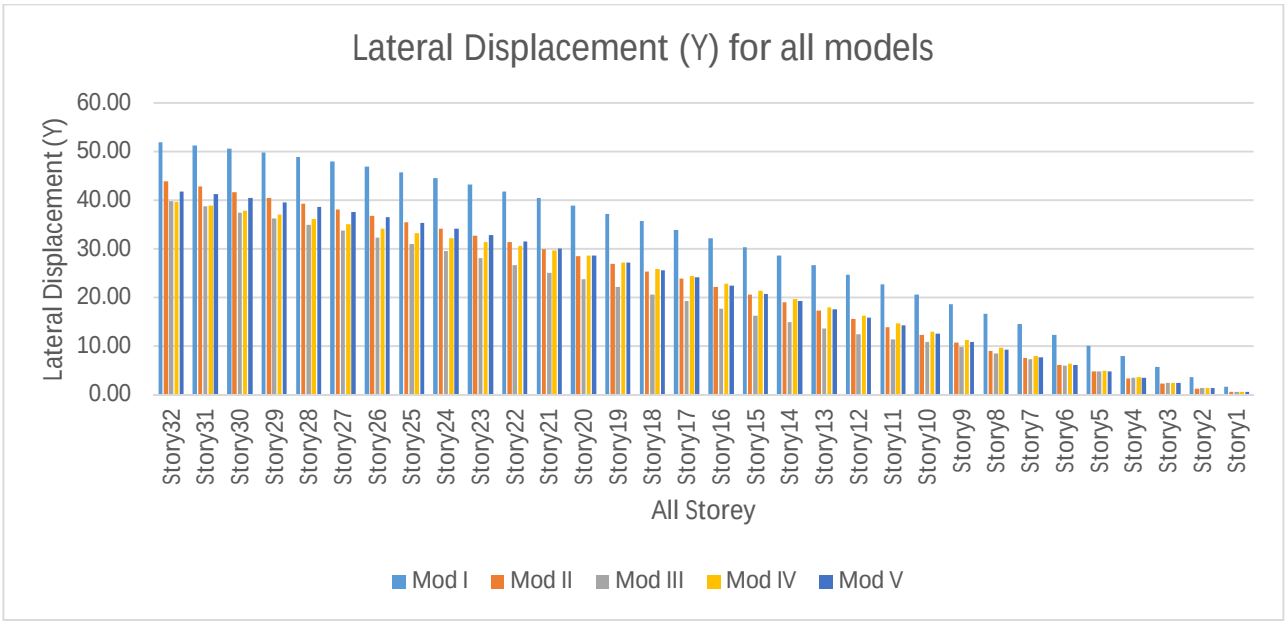

Fig.2: Lateral Displacement (Y) for all models

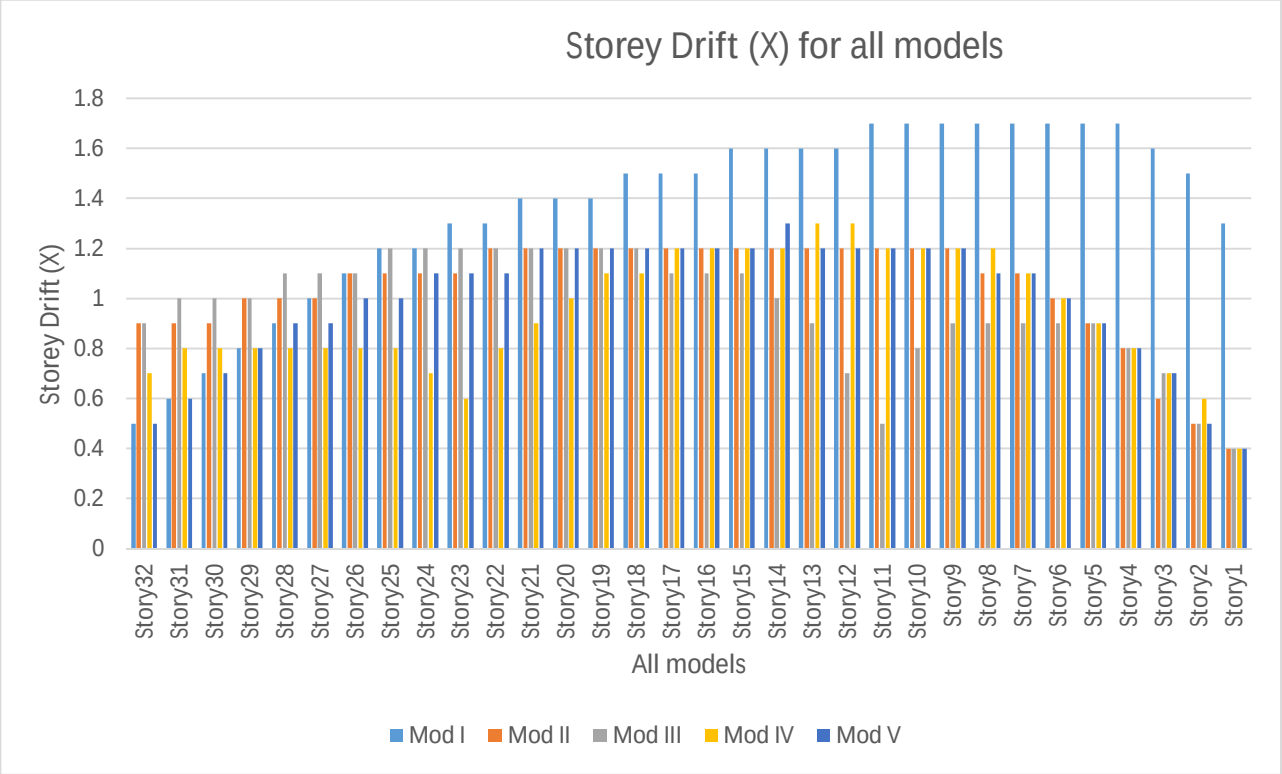

Fig.3: Storey Drift (X) for all models

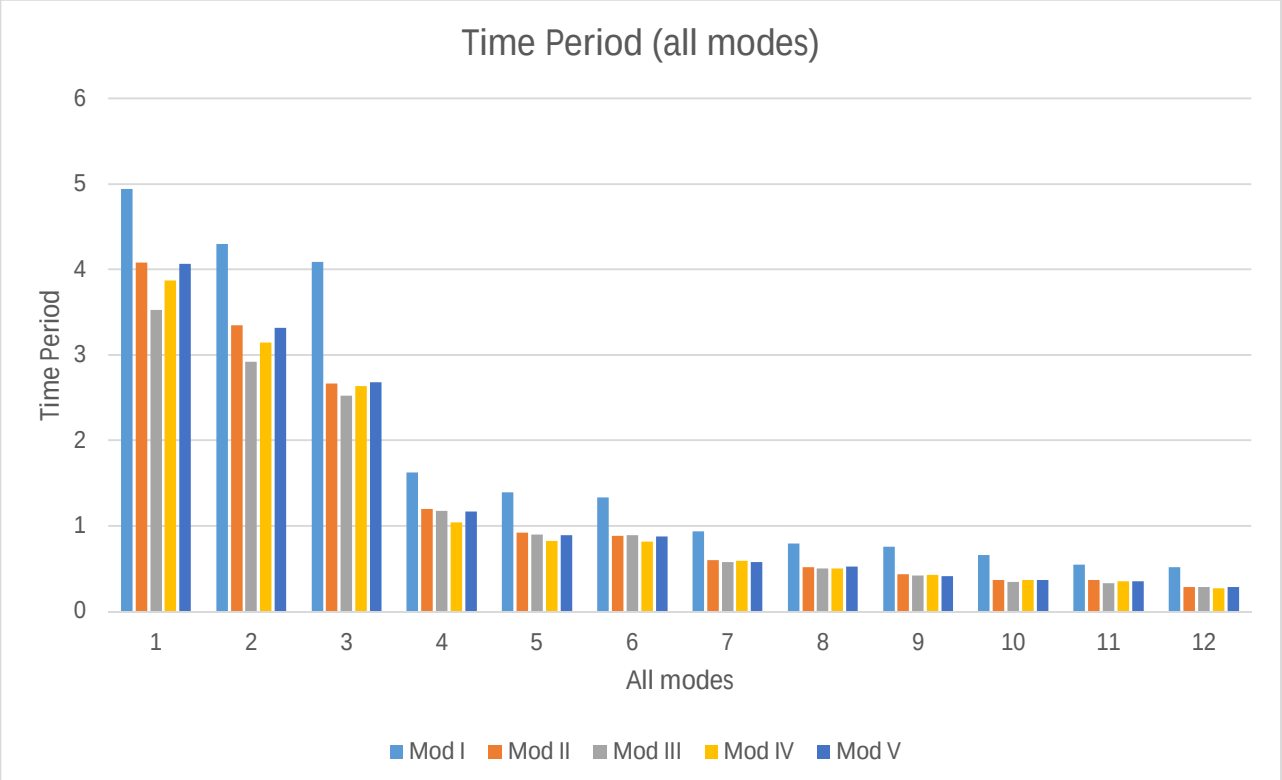

Fig.4: Time Period for all models

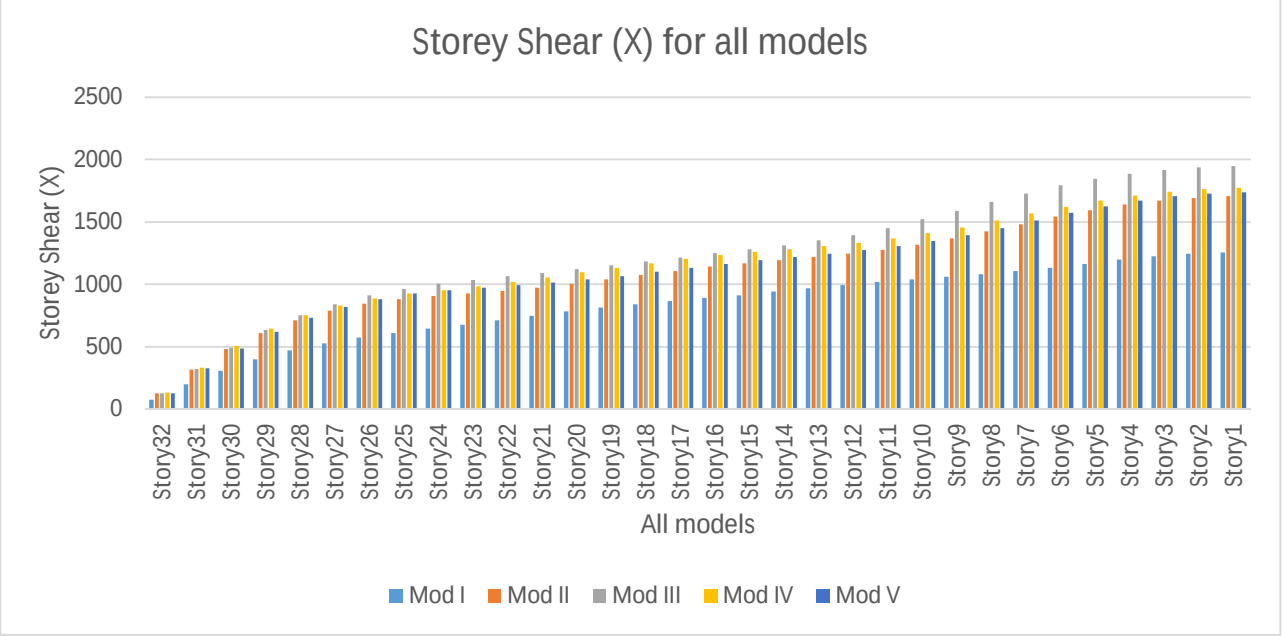

Fig.5: Storey Shear (X) for all models

V. CONCLUSION

The conclusions from the above study are as follows:

A. Lateral Displacement is maximum for the storey-32 for the model-I.
B. Storey Drift is maximum for the storey-5 for the model-I.
C. Time period is maximum for the mode-1in the case of model-1.
D. Storey shear is maximum for the model-III.
E. Storey stiffness is maximum for the model-III.

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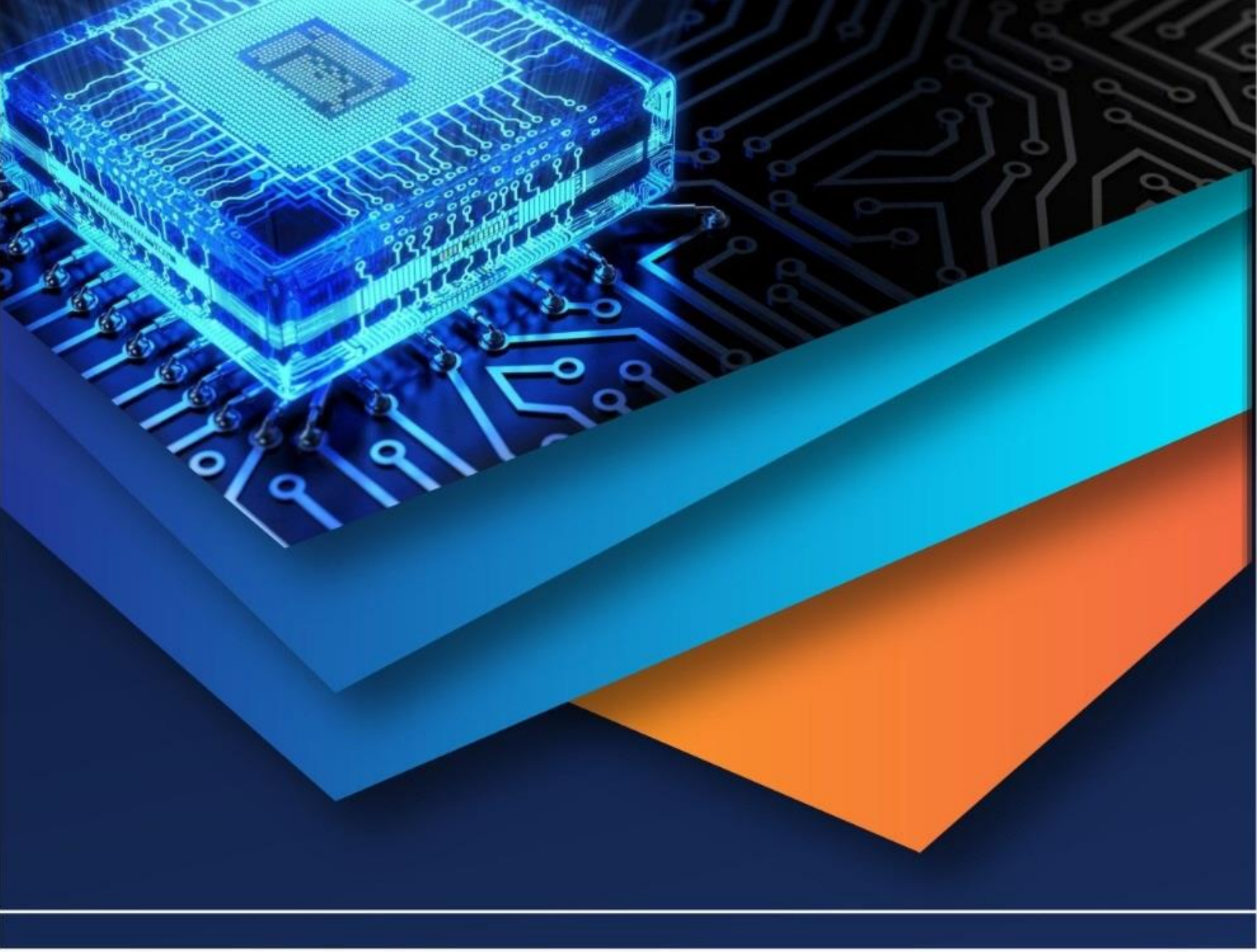

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