The 2024 World Congress on
Advances in Civil, Environmental, & Materials Research (ACEM24)
19-22, August, 2024, The K hotel, Seoul, Korea

Influence of Core Wall Eccentricity on Stress Concentration in High-Rise Reinforced Concrete Buildings

*Chaeyun Ahn[1)] and Thomas Kang[2)]

[1), 2)] *Department of Architecture and Architectural Engineering, Seoul National University, Seoul, Korea*
[2)] *tkang@snu.ac.kr*

ABSTRACT

Effective stiffness is crucial for predicting the accurate behavior of reinforced concrete (RC) buildings under seismic reversible loading, particularly post-cracking. However, for convenience, many modern high-rise buildings utilize standardized experimental values for the effective stiffness of vertical members (Ugalde et al. 2020). This approach may lack accuracy, especially in buildings with stiffness eccentricity. The primary objective of this study is to quantitatively assess the impact of stiffness eccentricity on member force distribution in buildings. To accomplish this objective, a comparative analysis of member forces is conducted in buildings with varying degrees of stiffness eccentricity, ranging from 0% to 20% in 5% increments, utilizing nonlinear time history analysis (NTHA). The results of this study are expected to demonstrate that the effective stiffness values in eccentricity-prone buildings may differ significantly from those in regular structures. This finding will provide a compelling rationale for future research aimed at more accurately predicting and evaluating effective stiffness in eccentric buildings.

[1)] Graduate Student
[2)] Professor

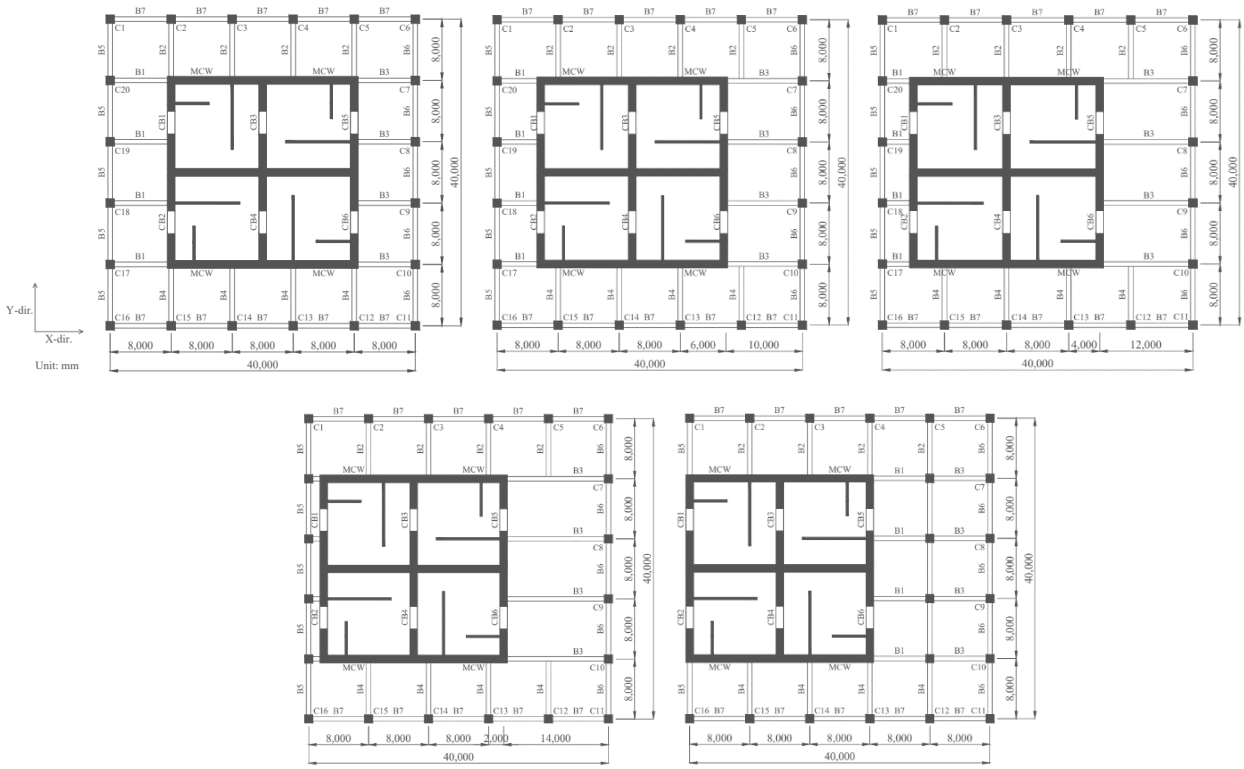

Fig. 1 NTHA models with 0%, 5%, 10%, 15%, and 20% stiffness eccentricity [unit: mm]

ACKNOWLEDGEMENT

This research was supported by National Research Foundation of Korea (No. 2021R1A5A1032433) and by the Institute of Engineering Research at Seoul National University.

REFERENCES

Ugalde, D., Lopez-Garcia, D., and Parra, P.F. (2020), "Fragility‐based analysis of the influence of effective stiffness of reinforced concrete members in shear wall buildings", *Bull. Earthquake Eng.*, **18**(5), 2061-2082.