The 2025 World Congress on
Advances in Structural Engineering and Mechanics (ASEM25)
BEXCO, Busan, Korea, August 11-14, 2025

Evaluation of Unbalanced Moment Resistance Performance According to Shear Reinforcement Shape of Flat Plate Slab-Column Joint

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ABSTRACT

Lateral loads can induce an unbalanced moment at flat plate slab-column joints, which can lead to brittle punching shear failure in the slab. To avoid this critical failure mode and ensure life safety, the use of shear reinforcement is necessary. However, the slab–column joint is a highly congested region due to the concentration of slab and column reinforcement, making the installation of shear reinforcements such as closed stirrups difficult. Band-type and truss-type shear reinforcements have been proposed as effective alternatives, offering advantages in constructability, and maximizing the effective depth of slabs. In this study, quasi-static cyclic loading tests were conducted to investigate the unbalanced moment resistance of flat plate slab–column joints reinforced with band-type and truss-type shear reinforcements. Additionally, finite element analysis was performed to derive the optimal reinforcement configuration for each shear reinforcement type based on the experimental results. The results showed that the optimized reinforcement configurations for the band-type and truss-type shear reinforcements provided equal or superior reinforcement effects compared to conventional closed stirrups.

REFERENCES

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