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Analysis of Load Distribution Characteristics Based on the Geometry of 3-D Asymmetric Structures

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ABSTRACT

This study compared and analyzed the differences in member forces between symmetric and various types of asymmetric 3-D structures. A numerical analysis model based on the Moment-Curvature relationship was constructed to rapidly perform numerical analysis on 3-D asymmetric structures. Additionally, the numerical analysis model was configured to account for the time steps and construction stages to accurately reflect the differences in member forces that occur in actual construction. The study verified whether the behavior of members in symmetric 3-D structures could be sufficiently examined through 2-D numerical analysis and then compared and analyzed symmetric and asymmetric 3-D structures. Asymmetric structures were selected based on shapes that are difficult to represent in 2-D. Three parts, where the member forces were expected to vary the most within the asymmetric structures, were selected for detailed analysis. The results showed the trends in member forces according to the shapes of 3-D asymmetric structures and indicated that, for preliminary stages, member force analysis could be conducted using 2-D numerical analysis.

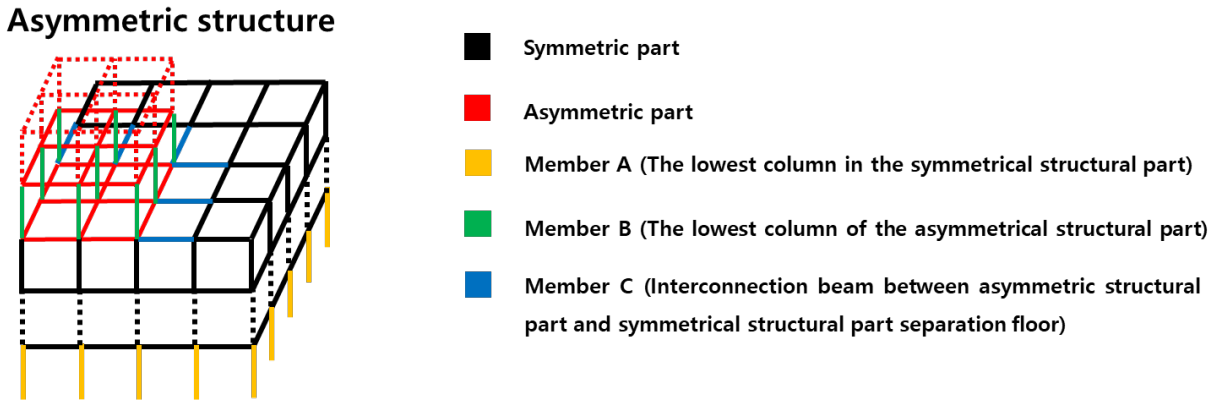

Fig. 1 Selection of Key Load-Differentiating Members Based on the Shape of 3-D Asymmetric Structures

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