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Time-dependent analysis of RC structures considering the construction sequences and structural symmetry

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The analysis and design of a reinforced concrete (RC) structures are generally conducted based on the complete structures. However, the construction of a RC structure is accomplished through a sequential construction, and the change in the structural system during each construction step causes remarkable differences in the structural behavior. This research deals with rigorous analysis of RC frame structures and prediction of exact structural response during the construction. Time-dependent deformations of concrete such as creep and shrinkage were taken into consideration and the construction sequences were described. The stiffness matrix of a beam element was derived on the basis of the layer approach, dividing a section with imaginary layers, and the iteration method adopted for structure analysis was the combined method. Creep and shrinkage strains at each layer were calculated by using the first order algorithm based on the expansion of creep compliance. Correlation studies with the numerical analysis results of low-rise, medium-rise and high-rise RC frame structures were conducted to assess the differences in structural responses according to the construction sequences and profile of the structure. This research was supported by a grant(13SCIPA01) from Smart Civil Infrastructure Research Program funded by Ministry of Land, Infrastructure and Transport(MOLIT) of Korea government and Korea Agency for Infrastructure Technology Advancement(KAIA) and financially supported by Korea Ministry of Land, Infrastructure and Transport(MOLIT) as U-City Master and Doctor Course Grant Program.

Biography

WonHo Lee has completed his Master's degree from Korea Advanced Institute of Science and Technology. At present, he is a PhD program student at Civil and Environmental Engineering Department of Korea Advanced Institute of Science and Technology.

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