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Practical Design Procedures of 3D Reinforced Concrete Shear Wall-Frame Structure Based on Structural Optimization Method

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Abstract : This study investigates and develops the structural optimization method. The effect of size constraints on practical solution of reinforced concrete (RC) building structure with shear wall is proposed. Cross-sections of beam and column, and thickness of shear wall are considered as design variables. The objective function to be minimized is total cost of the structure by using a simple and efficient automated MATLAB platform structural optimization methodology. With modification of mathematical formulations, the result is compared with optimal solution without size constraints. The most suitable combination of section sizes is selected as for the final design application based on linear static analysis. The findings of this study show that defining higher value of upper bound of sectional sizes significantly affects optimal solution, and defining of size constraints play a vital role in finding of global and practical solution during optimization procedures. The result and effectiveness of proposed method confirm the ability and efficiency of optimal solutions for 3D RC shear wall-frame structure.

Keywords : structural optimization, linear static analysis, ETABS, MATLAB, RC shear wall-frame structures
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