

Optimization of Steel Moment Frame Structures Using Genetic Algorithm

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Abstract : Structural design is the challenging aspect of every project due to limitations in dimensions, functionality of the structure, and more importantly, the allocated budget for construction. This research study aims to investigate the optimized design for three steel moment frame buildings with different number of stories using genetic algorithm code. The number and length of spans, and height of each floor were constant in all three buildings. The design of structures are carried out according to AISC code within the provisions of plastic design with allowable stress values. Genetic code for optimization is produced using MATLAB program, while buildings modeled in Opensees program and connected to the MATLAB code to perform iterations in optimization steps. In the end designs resulted from genetic algorithm code were compared with the analysis of buildings in ETABS program. The results demonstrated that suggested structural elements by the code utilize their full capacity, indicating the desirable efficiency of produced code.

Keywords : genetic algorithm, structural analysis, steel moment frame, structural design

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