

Coupled Optimal Design of Building with TMD

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An integrated approach to optimize the total cost of building and the associated control device has been proposed. Design parameters that constitute the costs of the structure and the control system have been considered simultaneously in the optimization process. Constraints for performance of the design include peak inter-story drift and peak absolute acceleration of the floors. Genetic algorithm has been implemented to solve the coupled optimization problem. A three- and a nine-story building subjected to design seismic excitations were studied as examples to assess suitability of this integrated optimization strategy. The control device considered for example problem is a tuned mass damper (TMD) installed at the roof of the building. Results indicate that the proposed approach leads to superior solutions not previously envisaged. The study concludes that for 3-story example problem, building alone without any TMD is an optimal solution while for 9-story, a building with a TMD is the best design.

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