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Assessment of Design Recommendations for Torsionally Unbalanced Structures Using Structural Optimizati

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Title:	**Assessment of Design Recommendations for Torsionally Unbalanced Structures Using Structural Optimization**
Year:	2008
Author:	N. Bakas, N.D. Lagaros and M. Papadrakakis
Abstract:	n this work a number of design approaches for 3D Reinforced Concrete (RC) buildings are formulated as structural optimization problems and are assessed in terms of their performance under earthquake loading. In particular, the total life cycle cost is considered as a measure for assessing the behaviour of the designs obtained. Three design philosophies for the design of RC buildings are considered in this study. In the first one the initial construction cost is considered as the objective function to be minimized, the second is formulated as a minimization problem of the torsional responses while a combined formulation is also examined as the third design approach. The second approach is implemented with two formulations: (i) minimization of the distance between the mass and rigidity center, (ii) minimization of the distance between the mass and strength center. It is shown that designs obtained according to the minimum eccentricity of the rigidity centre formulation behave well in frequent (50/50 hazard level) and occasional (10/50 hazard level) earthquakes, while designs obtained according to the minimum eccentricity of the strength centre formulation behave well in rare (2/50 hazard level) events.

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