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Minimizing the Torsional Response of RC Buildings Under Earthquake Loading

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Title:	MINIMIZING THE TORSIONAL RESPONSE OF RC BUILDINGS UNDER EARTHQUAKE LOADING
Year:	2006
Author:	Bakas, Nikolaos ; Lagaros, N. D. ; Papadrakakis, M.
Abstract:	In 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 the 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 one 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 considered with two distinctive formulations. According to the first one the torsional behaviour is minimized by considering the minimization distance of the mass center and rigidity centre while in the second one this is achieved by minimizing the eccentricity between the mass center and the 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. Designs based on a combined formulation seem to behave equally well in the three hazard levels examined.

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