



Epicentral distance and Eigen period randomness effect on the RC buildings' seismic responses: The case study of Boumerdes (Algeria) 2003 earthquake

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Abstract

The herein paper deals with the study of the effect of the epicentral distance and the RC building's Eigen period on their structural responses. First, low- and medium-rise RC buildings are tested under the effect of records collected during the Boumerdes earthquake (Algeria, May 21st, 2003) at different epicentral distances. Which allowed developing formulations linking the RC structural responses namely: base shear, storey displacements, interstorey drifts versus the epicentral distance and building's Eigen period, where the good fitting was verified according the statistics.

The whole responses are directly proportional to the building's Eigen period, ground acceleration and inversely to the site epicentral distance. In a second step, considering the chosen parameters as random variables, with lognormal distribution, a probabilistic investigation has been carried out, through Monte Carlo simulation.

The results emphasizes that the developed formulas are more influenced by epicentral distance uncertainty than that of the Eigen period. A good accuracy in the established formulations is reflected by the small width of the confidence intervals of the studied responses.