

Mecano-Reliability Coupled of Reinforced Concrete Structure and Vulnerability Analysis: Case Study

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Abstract : The current study presents a vulnerability and a reliability-mechanical approach that focuses on evaluating the seismic performance of reinforced concrete structures to determine the probability of failure. In this case, the performance function reflecting the non-linear behavior of the structure is modeled by a response surface to establish an analytical relationship between the random variables (strength of concrete and yield strength of steel) and mechanical responses of the structure (inter-floor displacement) obtained by the pushover results of finite element simulations. The push over-analysis is executed by software SAP2000. The results acquired prove that properly designed frames will perform well under seismic loads. It is a comparative study of the behavior of the existing structure before and after reinforcement using the pushover method. The coupling indirect mechanical reliability by response surface avoids prohibitive calculation times. Finally, the results of the proposed approach are compared with Monte Carlo Simulation. The comparative study shows that the structure is more reliable after the introduction of new shear walls.

Keywords : finite element method, surface response, reliability, reliability mechanical coupling, vulnerability

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