

Surveying Earthquake Vulnerabilities of District 13 of Kabul City, Afghanistan

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Abstract : High population and irregular urban development in Kabul city, Afghanistan's capital, are among factors that increase its vulnerability to earthquake disasters (on top of its location in a high seismic region); this can lead to widespread economic loss and casualties. This study aims to evaluate earthquake risks in Kabul's 13th district based on scientific data. The research data, which include hazard curves of Kabul, vulnerability curves, and a questionnaire survey through sampling in district 13, have been incorporated to develop risk curves. To estimate potential casualties, we used a set of M parameters in a model developed by Coburn and Spence. The results indicate that in the worst case scenario, more than 90% of district 13, which comprises mostly residential buildings, is exposed to high risk; this may lead to nearly 1000 million USD economic loss and 120 thousand casualties (equal to 25.88% of the 13th district's population) for a nighttime earthquake. To reduce risks, we present the reconstruction of the most vulnerable buildings, which are primarily adobe and masonry buildings. A comparison of risk reduction between reconstructing adobe and masonry buildings indicates that rebuilding adobe buildings would be more effective.

Keywords : earthquake risk evaluation, Kabul, mitigation, vulnerability

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