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Predicting Buildings Collapse due to Seismic Action in Lagos State

Akpabot I. Akpabot[1,a], Anthony N. Ede[1,b*], Oluwarotimi M. Olofinnade[1,c], Gideon O. Bamigboye[1,d]

[1]Department of Civil Engineering, Covenant University, Ota, Nigeria

[a]akpabot.akpabot@covenantuniversity.edu.ng, [*b]anthony.ede@covenantuniversity.edu.ng, [c]rotimi.olofinnade@covenantuniversity.edu.ng, [d]gideon.bamigboye@covenantuniversity.edu.ng

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Abstract. Buildings worldwide are one of the most essential assets of humans, and they serve as a major contributor to the sustainable development of any nation. The consequences of building collapse are colossal ranging from loss of lives, damage to properties and its attendant socio-economic implications, etc. This menace appears to be worst-off in developing countries like Nigeria where capacity to manage disaster is lacking. Recent incidence of seismic actions in hitherto geographically aseismic zone, has led to prediction of earthquake occurrence in the nearest future. This research attempts to compute the seismic hazard of buildings in Lagos State, a densely populated area of Southern Nigeria. Based on known seismic ground motion for South-Western Nigeria, a model is developed that estimates the casualty and built area that would be affected by earthquakes with different seismic intensities. MATLAB software using Monte Carlo simulation to draw random data samples of built area, construction quality, probability of failure and occupancy level is used for the computational analysis. The result showed that existing construction quality is poor portending a high degree of damage during moderate intensity earthquake. A significant risk reduction is achievable for both the impending collapse and severe damage performance levels if the existing construction quality is improved.