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PREAMBLE

The seismic vulnerability in urban areas is rapidly increasing due to uncontrolled growth, destabilization of environment and social framework. The Global Statistics taken for the period 1973-1997, organized in 5-year bins, exhibit that earthquakes are amongst the disasters with larger death impact even though the occurrences of flood events are twice per year. According to the International Disaster database, out of the total human fatality of ~18 lacs in Asia during the period between 1900 to 2015, around 7.8 lacs casualtywith economy loss of ~ 5000 million (USD) is estimated the Indian subcontinent only. There has been a consistent sequence of earthquakes in the Indian subcontinent since ancient times and it is one of the most earthquake prone regions of the world and is susceptible to the seismic vulnerability because of its high population, rapid development and unplanned urbanization.

Though large earthquakes cause immense damage & destruction, it also provides an opportunity for the seismologists to get more insight into the internal structure of the earth to gain a better understanding of the mechanism of earthquakes. The studies carried out after the occurrence of strong earthquakes have provided basic knowledge and information on the phenomenon to provide necessary input for the assessment of seismic hazard and its possible mitigation. These post-earthquake surveys gave further insights into the destructive pattern of earthquakes caused due to complex processes as implicated by (a) seismic source, (b) propagation of the seismic wave through a medium and (c) the local geology. Due to the heterogeneous nature of the earth's crust, the seismic waves undergo multiple reflections, refractions and transformations along their path from the source to the site of observation. The changes are more prominent near the surface underlain by soil, where the geological and geotechnical properties of the soil layers play an important role in the amplification of the seismic energy.

The vulnerability of modern society towards earthquake hazard is increasing with time. Although the occurrence of earthquakes is inevitable, the reduction of the social and economic setback during earthquakes can be achieved through a comprehensive assessment of Seismic Hazard Microzonation and Risk. Microzonation has generally been recognized as the most accepted tool in seismic hazard assessment and risk evaluation and it is defined as the zonation with respect to ground motion characteristics taking into account source, path and site conditions.

With more than ten million inhabitants, several major industrial facilities, ports and transportation arteries, Kolkata stands as a major center for business with hinterland covering the entire eastern and northeastern India. The area is characterized by significant seismic activity and very thick Holocene alluvium. Such deposits are likely to soften during an earthquake and are susceptible to liquefaction and lateral spreading. The objective of 'Kolkata Seismic Microzonation' undertaken by Prof. Sankar Kumar Nath, Indian Institute of Technology Kharagpur alongwith the collaborating investigators from other organizations in West Bengal accomplished the assessment of the earthquake response of the onshore and near shore areas of the Kolkata region. In-situ geotechnical testing for assessing liquefaction susceptibility, shear-wave velocity and insituseismic measurements coupled with detailed site-response analyses have been utilized to assess the basinal characteristics of the region. The study provided GIS-based Probabilistic Seismic Hazard, Vulnerability and Risk Mapson 1: 25,000 scale and all the results and detailed analyses, synthesis have been encapsulated in this "**Seismic Hazard, Vulnerability and Risk Microzonation Atlas of Kolkata**". The results of these endeavors are expected to be used for upgrading urbanization protocol and revising the existing building codal provisions. I congratulate the team led by Prof. Nath for accomplishing this major task.

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