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Seismic Hazard Assessment of Tribal District Headquarter Dantewara of Chhattisgarh State (India)

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ABSTRACT

Tremors, the most precarious and catastrophic natural hazards in the globe, manifest themselves in the form of vibrations of the ground which are caused by the sudden release of strain that has accumulated over time. In recent years, there has been a rise in public awareness about earthquakes, their causes, and mitigations. The approach of quantifying the area in terms of topographical and seismological data is known as seismic hazard analysis. In the present chapter, an attempt has been made to estimate seismic hazard at bedrock level in terms of Peak Ground Acceleration (PGA) using state of art, deterministic and probabilistic seismic hazard analysis. A comprehensive catalogue of historical and recent seismicity, within 300 km radius around headquarter has been compiled and new seismic tectonic map has been engendered for the region. In the seismic tectonic map, 13 number of faults have been considered as major seismic sources around the district headquarter Dantewara. Before conducting a hazard analysis, make sure that the data is complete. Finally, earthquake data was statistically analysed, and the seismicity of the region around Dantewara, Chhattisgarh's district headquarters, was assessed by defining the 'a' and 'b' parameters of the Gutenberg- Richter recurrence relationship. Values of the PGA for M100 Earthquake have been estimated for the district headquarter Dantewara. Liner faults have been used to develop seismic hazard curve for study area. For peak ground acceleration value 0.05g the estimated return period is low on the other hand for higher PGA(g) value 0.10g the estimated return period is high for study area. The outcome of the research is clearly indicated that the maximum PGA values for the site of Dantewara, was obtained, due to fault No. 8.

Keywords: Linear sources; peninsular India; peak ground acceleration; return period; seismic hazard.

1. INTRODUCTION

After its declaration as new district of Chhattisgarh, the construction activities in Dantewara, have shortly increased. So, it is indispensable to pay attention towards shaky disaster and its mitigation. Tremors are common observable facts which occur most often irrespective of instance and place. The natural hazards strike abruptly without any prior warning and create damage to life and property. The behavior of earthquake is unpredictable; hence prior warning to public is not possible. Tremors are not killer by themselves but, houses in which people reside kill them. During an earthquake, inadequately designed and built houses on feeble foundation collapse and sometimes associated fire risks kill the residents as well. India is extremely susceptible to earthquakes, up to 60% of the land being prone to tremors of Richter Intensity 7.0 and greater, that can cause structural damage. Tremors persist to cause extensive human fatalities, the majority of which are due to the collapse of man-made structures. Recent tremors have revealed the under-preparedness of the country in facing its impacts. Since short- or mid-term prediction of earthquakes is not easy, seismic safety of built environments will ensure that, the structures do not collapse; this forms an important cornerstone of tremor disaster mitigation efforts.

Poor community in developing countries is mostly at risk to calamity because of the place where they live. Past study shows that, they are more likely to reside in risky locations, such as steep slopes,

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