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Seismic Landslide Hazard Assessment of Mandi Town, Himachal Pradesh

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Abstract

This study performs slope displacement-based probabilistic seismic landslide hazard assessment for Mandi town. Here, the slope angles of the concerned region are obtained from the digital elevation map (DEM), and the material proper-ties are obtained from lithological information and literature. The critical acceleration of the slopes is estimated by combining the obtained slope angle and material properties. In this work, hazard assessment is performed considering the arid and fully saturated condition of the soil mass of the slopes. The PGA values are estimated for 100, 475 and 2475 years return periods by performing probabilistic seismic hazard analysis of the study region. Further, the PGA values and the slope displacement prediction equation are used to estimate Newmark's sliding displacement. Finally, the hazard map in terms of the probability of slope dis-placement (SD) value exceeding the threshold values of 5cm is presented. The developed seismic landslide hazard map highlights the areas that may experience co-seismic landslides in the future. The probability of occurrence of co-seismic landslides gets as high as 93.4% for saturated soil and 86.3 % for arid soil for a return period of 2475 years. This hazard map will help local authorities and planners with tools for assessing the seismic landslide risk associated with land use and taking necessary measures to minimize the damages.

Keywords: Co-seismic landslide, Seismic landslide hazard, Newmark sliding displacement, Mandi