

Quantification of Effects of Shape of Basement Topography below the Circular Basin on the Ground Motion Characteristics and Engineering Implications

Authors : Kamal, Dinesh Kumar, J. P. Narayan, Komal Rani

Abstract : This paper presents the effects of shape of basement topography on the characteristics of the basin-generated surface (BGS) waves and associated average spectral amplification (ASA) in the 3D basins having circular surface area. Seismic responses were computed using a recently developed 3D fourth-order spatial accurate time-domain finite-difference (FD) algorithm based on parsimonious staggered-grid approximation of 3D viscoelastic wave equations. An increase of amplitude amplification and ASA towards the centre of different considered basins was obtained. Further, it may be concluded that ASA in basin very much depends on the impedance contrast, exposure area of basement to the incident wave front, edge-slope, focusing of the BGS-waves and sediment-damping. There is an urgent need of incorporation of a map of differential ground motion (DGM) caused by the BGS-waves as one of the output maps of the seismic microzonation.

Keywords : 3D viscoelastic simulation, basin-generated surface waves, maximum displacement, average spectral amplification

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