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Evaluation of the effect of depth to bedrock on seismic amplification phenomena

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When an earthquake occurs, the propagation of the seismic waves is conditioned by local conditions, e.g., depth to seismic bedrock and impedance ratio between soft soil and seismic bedrock. Bearing in mind that the maximum depth of site investigations generally does not extend up to seismic bedrock depth, a parametric study was carried out with reference to ideal case studies in order to investigate the effect on local seismic amplification of the depth to bedrock.

The results are presented in terms of charts of amplification factors (i.e., ratio of integral quantities referred to free-field and reference response spectra) and minimum depth to investigate vs building type. These charts will allow defining the thickness of the cover deposit that should be characterised in terms of geophysical and geotechnical parameters in order to perform seismic site response analysis according to a precautionary approach, in areas where depth to seismic bedrock is higher than conventional maximum depth of site surveys.