

A method for the seismic design of multi-propped retaining walls

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This paper describes and validates a novel method for the seismic design of multi-propped retaining walls. The method is conceived as an application to excavations of the static-non-linear analysis employed for structural systems: this is a decoupled method, whereby the seismic demand and the seismic capacity are derived independently and are subsequently compared onto the acceleration-displacement plane. The seismic demand is described by an elastic response spectrum, that can be either derived from a ground response analysis, or can be directly specified by a building code. Conversely, the seismic capacity is obtained by applying horizontal static forces on the same model used to analyse the static construction sequence. The method is readily applicable in engineering practice, and has the advantage of considering explicitly the following aspects: (i) the influence of the construction sequence on the seismic response of the system; (ii) the deformability of the soil-structure system; (iii) the non-linear behaviour of the soil, including the attainment of its strength during the construction stages and the ensuing earthquake loading. Keywords: retaining structures, earthquake engineering, non-linear analysis