

# The Behaviour of a Structure within a Cluster of Structures in Earthquakes

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## **Abstract**

Most structures exist, not in isolation, but in a setting where there is sharing of the common supporting foundation soil. Generally, structures exist largely in clusters, particularly in CBDs, with varying degrees of interaction. Engineers are thus dealing with “systems”, where no structure exists in isolation. For convenience, however, in conventional design a stand-alone structure with a fixed base is considered, even though the soil not only affects the response of the structure, the adjacent structures and surrounding soil also alter the ground excitation of the structure of focus. It is well known that the best approach used by the most experienced engineer is useless when the load is incorrectly determined, because the result can only be as good as the load assumption.

During strong earthquakes, depending on the characteristics of the excitation (e.g., duration and magnitude) and site conditions, saturated loose sandy soil could develop high excess pore-pressure. This process can be rapid or gradual, and the end results may lead to liquefaction, i.e., excess pore-pressure rises to the level of initial vertical effective stress. Consequently, this soil behaviour will determine the overall behaviour of the structures.

This talk will address several facets of the seismic behaviour of the structure of focus with the influence of closely adjacent structures and supporting soil. To ensure the structural integrity, the overall performance of the soil-footing-structure system needs to be considered in design.