Seismic response of rocking-dominated elements

The dynamics of rigid blocks and rocking-dominated elements was systematically investigated since the '60s, and the so-called *classical theory* was initiated by the seminal work of Housner, even though few researchers addressed the issue even in earlier times. Researchers of the calibre of Priestley and Chopra studied the seismic response of rocking elements, and this topic is still a significant object of interest in current research. Since early times, the study of the dynamics of rocking blocks has often been focussed on monumental structures composed of freestanding elements, such as ancient Greek temples, identifying the key parameters governing the seismic response and developing a relatively robust assessment methodology. More recently, rocking has been adopted as a seismic protection strategy for structures and infrastructures, and several case studies and real applications proved that this approach can be extremely efficient. In very recent years, rocking has also been studied with regard to the seismic response of freestanding nonstructural elements, e.g., equipment and building contents. Despite researchers having been studying rocking dynamics for several decades, the topic still motivates and inspires current researchers. Several research questions remain unanswered, and the potential of rocking dynamics is yet to be fully known.

The seminar will provide a bird's eye view into the dynamics of rocking blocks with regard to the diverse nuances and applications in the literature and in practice. The aim of the seminar is to provide basic knowledge of the topic, possibly encouraging Ph.D. students and researchers to deepen the matter further. In particular, the contents will include basic motion equations, significant research contributions, representative engineering applications, and future perspectives.

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Journal papers

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3. **D'Angela A**, Magliulo G, Cosenza E. Incremental Dynamic Analysis of Rigid Blocks Subjected to Ground and Floor Motions and Shake Table Protocol Inputs. Bulletin of the New Zealand Society for Earthquake Engineering 2022; 55 (Early access). DOI: https://www.bulletin.nzsee.org.nz/index.php/bnzsee.

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