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Strongback system coupled with framed structure to control the building seismic response

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In the present paper the coupled behavior of structural systems obtained by connecting a moment resisting frame structure with a vertical elastic truss, known in the literature as strongback, which acts as a mast by imposing to the structure a given lateral deformed shape, is investigated. The rigid behavior of the strongback, which is designed in order to remain in the elastic field under strong seismic ground motion, imposes a uniform inter-storey drift along the frame height, thus avoiding undesired effects such as soft-storey and weak-storey mechanisms. Consequently, the whole structural system may be, at first approximation, modelled as an equivalent Single Degree of Freedom system thus allowing for a simple analytical description of its response. In particular, in the present work the attention is paid to the mutual actions exchanged by the strongback and the frame. Assuming a shear-type behavior an analytical solution of the static equilibrium equations is found. Finally, some numerical simulations of frame systems with strongback systems as subjected to earthquake ground motions are developed, encompassing both shear-type frames and frames with flexible beams.

Biography

Vittoria Laghi is a Research Fellow at the Department of Civil and Environmental Engineering (DICAM) at the University of Bologna. She is graduated at the University of Bologna (Italy) in 2016, and her Master's thesis has been partially developed at the University of California Berkeley. In 2015, she has also attended one semester at the University of California Berkeley as an exchange student. Her research interests include the broad field of Earthquake Engineering, with particular focus on the assessment of the seismic behavior of steel bracing systems, masonry infill and sandwich RC walls.

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