**A HEURISTIC APPROACH FOR OPTIMAL DESIGN OF BRACE-TYPE HYSTERETIC DISSIPATORS FOR SEISMIC PROTECTION OF FRAMED BUILDINGS**

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**ABSTRACT**

A number of brace-type hysteretic dissipators have been proposed for seismic protection of framed building structures; among them, the so-called buckling-restrained braces have experienced wide development, with extensive research and many actual implementations. As in any supplementary damping system, at least two devices per floor and per direction are installed, preferably in the building façades. Then, a major design issue is the selection of the values of the parameters that characterize the structural behavior of each device; although a number of criteria have been provided, this is still basically an open question. This paper presents a heuristic optimization approach to select such design parameters; the proposed strategy is based on a Particle Swarm Optimizer. In this formulation, the objective function is the minimization of the maximum drift and the base shear force under a representative set of earthquake ground motions; the constraints refer to functional and architectonic requirements. The aforementioned design parameters are the initial (elastic stiffness), the yielding force, and the final (post-yield or plastic) stiffness. An application example on five steel frames is presented. The ensuing nonlinear dynamic analyses are carried out using the software Opensees.

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