

The damped cable system for seismic protection of frame structures - Part II: Design and application

Sorace, S.^a, Terenzi, G.^b

^a Department of Civil Engineering and Architecture, University of Udine, Via delle Scienze 208, 33100 Udine, Italy

^b Department of Civil and Environmental Engineering, University of Florence, Via di S. Marta 3, Florence, 50139, Italy

Abstract

The complementary sections of the studies carried out on the damped cable system, whose experimental and numerical characterization and assessment analyses are described in the companion paper, are presented herein. The first section includes a criterion for a preliminary evaluation of the section area of cables, the second branch stiffness of spring-dampers and the mutual installation preload, and suggestions for a simplified nonlinear dynamic computation of the damping coefficient of dissipaters. A second section follows, aimed at evaluating the influence of cable layout on damped cable system performance. A numerical enquiry is developed on a four-story and an eight-story RC plane frame, to assess their seismic response for several shapes of cables, and determine what geometrical configurations are the best performing ones. In the third section, a demonstrative application of the protective system, represented by the seismic retrofit of a hospital building with RC structure, is offered. The characteristics of the system designed for this case study, including locations, dimensions, layouts, and technical installation details of cables and spring-dampers, are illustrated, and the improvement of seismic performance as compared with the original conditions, is finally assessed. © 2011 John Wiley & Sons, Ltd.