



The Department of Architecture invites you to the presentation of the Ph.D. Thesis of
Mr. Kristis Alexandrou titled:

«Hybrid Cable Bending-Active Structures»

Tuesday, 24 April 2018, 12:00.
Department of Architecture, Ledras 68, 305

ABSTRACT

Recent applications of bending-active structural principles have facilitated the development of unique, material and energy efficient, free-form lightweight systems. The systems are realized through the application of an interdisciplinary design, computational fabrication, exclusive assembly techniques and construction. These aspects are directly linked to the form-finding process through the bending-active members' activation. A number of design and construction parameters necessary for the morphological objectives succession, as well as the consideration of the deformation behavior of the systems, have raised the challenge of associating generative configuration parameters with their respective post-formed load-deformation behavior. Thus, alternative assembly, erection activation and deformation control strategies are investigated in hybrid configuration prototypes that involve coupling of the elastic members and the use of tension-only elements of modifiable length.

The current research investigates in parametric numerical studies, the deformation control and load-deformation behavior of a series of hybrid cable bending-active structural prototypes. In all analysis stages the role of the cable to work for both, actuation and strengthening of the systems is examined. The effects of cable elements in hybrid configurations of primary bending-active members are demonstrated using six different design alternatives of simple, simply-paired and paired-interconnected elastic strips. Finite-Element Analysis of the proposed systems is developed following a custom consecutive framework through alternative text input commands. The numerical investigation for all stages of assembly, fastening and load-deformation of the systems, revealed the favorable members' prestress characteristics and global morphological attributes, in order to provide an improved load-deformation behavior of the systems.

Kristis Alexandrou owns a BA (hons) in Architecture and Design from the University of Brighton and a Diploma of Architect-Engineer from the University of Cyprus. He is currently Research Associate and Adjunct Faculty at the Department of Architecture, teaching in the area of architectural technology. His research work was presented and published in four international scientific conferences and four international scientific journals. Currently, further two international scientific conference papers are in preparation and three international scientific journal papers are under review.