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# Towards a new tectonics in bamboo

– A comparative cross-cultural case study in development and construction of different split bamboo constructions with arbitrary double curved forms.

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## Abstract

The idea of this project called COCOON is to investigate architecture designed with split bamboo from a sustainable low-key point of view, but with an experimental approach to material, form, construction and space, that involves architects and architectural students from different places and cultures with their unique individual backgrounds.

The project consists of three different built case studies 1:1. The first in South India, the second in Italy and the third in South Korea, which explores the use of split bamboo constructions to make arbitrary double curved forms in buildings.

COCOON I is a climate responsive building, that serves as an alternative learning centre for none educated farmers in Trichy, South India (Figure 1, 2). Cocoon II is a mobile and folding construction used as a pavilion at the Milan design week 2015 in Italy. COCOON III is built in South Korea as a doubled curved installation constructed in set pieces, that can be assembled in various combinations to adapt to different spatial situations.

The results show a unique approach to different split bamboo construction methods, were it is possible to merge new digital computer techniques with a craftsman's understanding of the bamboo material. The main design tools have been analogue models and digital computer models generated in the programs of Revit, Rhino, T-spline and Grasshopper. Inspirations have been light lattice structures by Frei Otto and organic split bamboo constructions by professor Auwi Stübbe, Germany. The project proves it is possible in the future to investigate and use the potentials of arbitrary double curved forms in split bamboo constructions for new sustainable architectural solutions.

**Keywords: Bamboo, tectonics, cross-cultural investigation**

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## Illustrations

Figure 1: COCOON I. Bamboo building seen from southwest with shingle roof in bark and granite plinth

Figure 2: COCOON I. Interior with split bamboo construction, wall/ceiling and central woven bamboo column



Figure 1



Figure 2