Politecnico di Torino

Honors Thesis

Master of Science in Sustainable Architecture
Master of Science in Architecture Construction and City

Abstract

Hemp pavilion:
A study of a structural natural material building based on hempcrete

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Nowadays there is a global effort in reducing the emission of green house gasses in order to avoid the climate changes. In this scenery, construction industry is one of the biggest waste and CO_2 producers globally, so it is important to re-think how the material are being used and which materials are being chosen for buildings. Hempcrete is a plant based natural material, with low to negative embodied carbon and lower embodied energy then Portland cement, material with grate use in the construction industry.

It is usually applied as a non-load bearing insulation material.

In 2009, at Welsh School of Architecture (Cardiff, Wales), the architect David Lea built, during a training workshop, a load bearing hempcrete prototype arch in full scale to verify the structural performance of the material.

This thesis is a development with further analysis of David's Lea design, here we are going to explore two main fronts: the laboratory analysis which defines the hempcrete mix to be used in the projects and planning of the vault prototype; and the preliminary design for a 30mq hempcrete pavilion. The pavilion design remains preliminary cause it depends on the prototype mechanical testing results for better detailing it. In this way, we can provide material for further development of the project and construction site.


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