

Temporary Bamboo Shelter

[Project title]

AW20-KJZRJ

[Project ID]

LafargeHolcim Awards (Main Category)

General Project Data

Project Group 2	Landscape, urban design, transportation infrastructure and public utilities
Competition region	Latin America
City	North Coast (Tumbes, Piura) / (Lambayeque, La Libertad)
Country	Peru
Client	Local Government
Intervention	New construction
Status of planning	Final design stage
Status of permission	--Other--
Planned start	Jan-Jun 2021
Project background	Public commission
Latitude	5
Longitude	80
Elevation	77
Other competition	no



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Project Summary

The fundamental principle for the design of the Bamboo Temporary Shelter was the creation of a safe and ecological solution that includes three common factors: Simplicity, Efficiency and Replicability, where time is an important component for its execution. For this, different cases were studied in the world, with successful examples, and the Minimum Standards on Housing and Human Settlements and Non-Food Items, 2013. A bamboo structure was proposed following the Da Vinci principle, considering the following criteria: 1. Simple: Simple to build, 95% are straight cut pieces, 2. Efficient: Structurally adequate, all parts fulfill a structural function, and 3. Replicable: Practical, serial parts. The use of bamboo in forms of plump, slats and crushed or mat.

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Project Details

Construction costs	1650 USD
Site area	19.60 sq m
Footprint area	sq m
Floor area ratio	
Site occupancy ratio	70%

Further relevant key figures

Dimensions: 4.90 m x 4.80 (limits)
 Weight: 176 kg (total) - 2.52kg per bamboo
 Capacity: 5 (more than 3.5 m² / person)
 Time: 5 to 6 days
 Team: 6 people (2 with basic knowledge in bamboo construction)

Materials

Structure and covering: bamboo Guadua, between Ø12 cm and Ø8 cm - 85%
 Earth with straw.
 Connections: Metals - 4%
 Floor: local wood and OSB - 5%
 Roof Cover: Cloth or earth with straw - 5%

CO₂ Lifecycle Assessment

For the evaluation the life cycle stages established by Standard UNE-EN 15978 are considered:

Production stage. Raw Material: 70 bamboos from local plantations - Use 85%, Manufacturing: selection and harvest (manual saw tool), removing branches (manual palin), preservation (concrete pools and borax salt preservatives), drying (air free), Transportation: Local
 Construction Stage. Construction process: bamboo structure (electric circular saw and electric or wireless drill), floors, covering and cover (electric or wireless drill)
 Final Stage. Bamboo Waste can be reused to generate bamboo charcoal or energy.
 Since the forest and / or plantation becomes a CO₂ sink, as a permanent product the CO₂ remains trapped and at the end of its useful life, the waste can be burned for energy production.

Statements on Sustainability

Innovation and transferability - Progress

Temporary Bamboo Shelter, responds to the revaluation of renewable, natural and local materials, with contemporary technologies proposing an integral structure of bamboo (plump) covered with crushed bamboo and earth. Fifteen percent is used in wood and OSB and only 5% of metals in the connections.

The estimated time for execution is five to six days with the material on site, with six people, two of them with basic knowledge in bamboo construction that can guide the other four.

One could think of a future to have a warehouse of preserved and standardized parts to just assemble them and measure the execution time. If they build several modules of temporary bamboo shelters, CO₂ retention could be measured against other solutions with other materials.

Ethical standards and social inclusion - People

As it is a project that provides an alternative for temporary shelter in an emergency situation, human resources fulfill a very important function where teamwork will strengthen shared values. Many times the government and private institutions do not give solutions in the time it takes or reach the entire population. If the populations were prepared and had a guide for the self-construction of these temporary shelters, having the bamboo resource nearby or warehouses with the pieces, they could give faster and more efficient solutions.

Resources and environmental performance - Planet

With the construction of several modules of temporary bamboo shelters, it will help minimize the ecological footprint compared to other solutions with other materials and maximize the positive impact on the environment. Above all, at the end of the useful life, the waste modules can be burned for energy production.

In this sense, the production of bamboo pieces for shelter modules would boost the cultivation and management of plantations and natural forests, in this way the environmental impact of the constructions would be positive in its different phases. From the forest and / or plantation as a built product and if at the end of its useful life.

The structure uses 70 bamboo culms of 6m and 12 cm in diameter, which contributes to fix 0.4 TN of carbon.

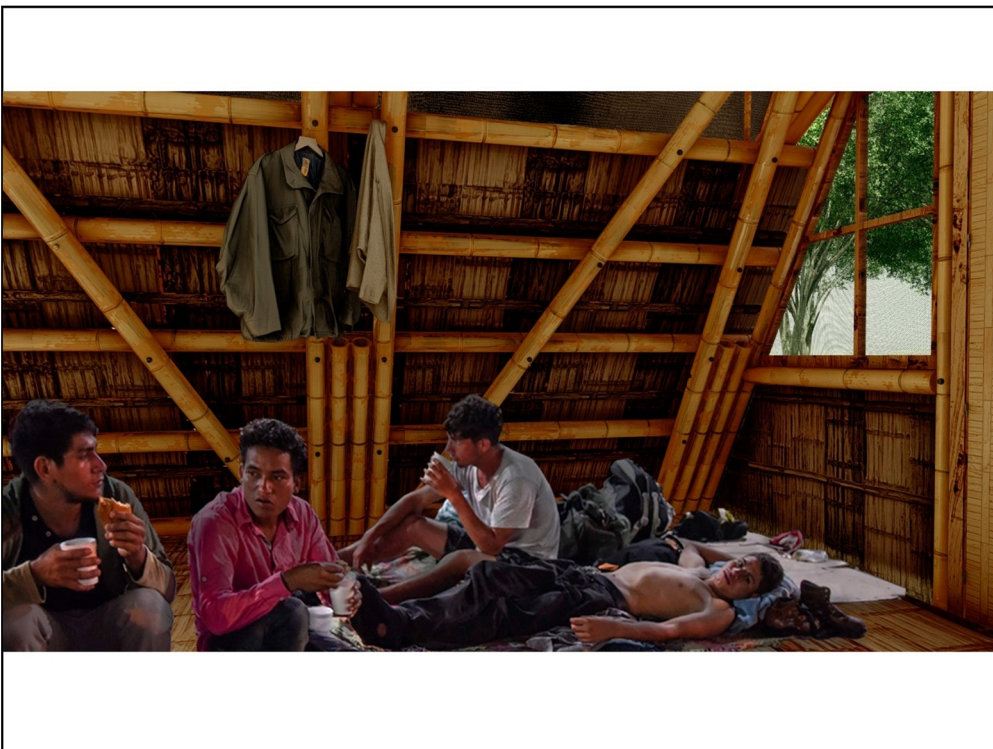
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Project Visualization



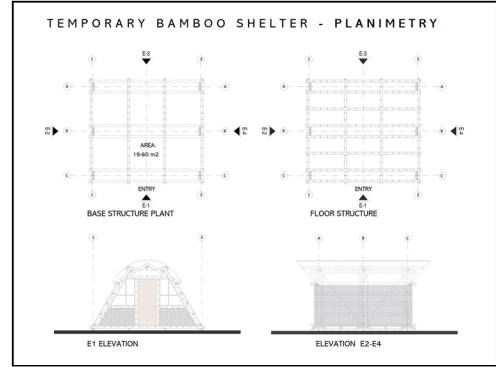
The Bamboo Temporary Shelter is proposed that can be replicated in emergency situations in other geographical areas with similar climatic characteristics and where the bamboo resource exists. In addition to the possibility of self-construction by the local population linked to community and inclusive work at a time when the solidarity show is required.



The project proposes an alternative for a temporary shelter in emergency situations with a safe and ecological solution, quick to build and with minimal impact to the environment. If the populations were prepared and had a guide for the self-construction of these temporary shelters, having the bamboo resource nearby or warehouses with the pieces, they could give faster and more efficient solutions.



For this, the design is based on the Da Vinci principle



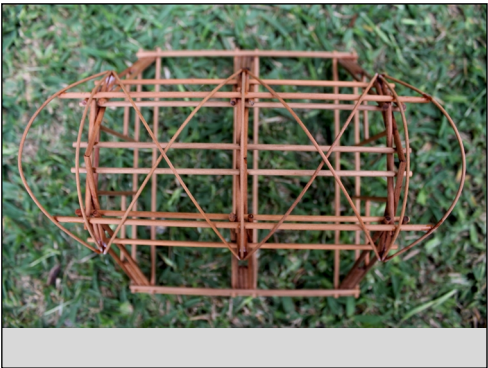
Project Planimetry, the structure uses 70 bamboo culms of 6ml and 12 cm in diameter.



Constructive Process: Simple, Efficient, Replicable.



Project mockup.



Project mockup - Plant View, simple symmetry.



View from the inside.



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