INSU-RAM

Rammed Earth Construction System
By ArchiLoop Research
THE PROBLEM

Currently, traditional housing of the Wayuu community has a lack in thermal control, habitational security, and aesthetic values due to economic factors and the low use of local materials to build. The construction materials that are currently used are expensive because of the transportation cost that comes from transporting building materials from urban centers that also contributes to the degradation of the local indigenous traditions and the ecosystem itself due to the high carbon footprint materials they are using.

WEATHER

- Strong winds from the caribbean sea and north trade winds.
- Low rainfall
- High temperatures (40°C)
- Arid and dry.

ECONOMY

Almost 70% of the economy depends on mining activities, which cause land degradation (air pollution, loss of vegetation, heat islands) and affect the quality of life of the inhabitants.

POPULATION

Native people represent 44% of the department’s total population and most of them live in the four indigenous territories located there.

HOUSING

68.2% is housing deficit almost double the national average.

63% of the qualitative deficit corresponds to a lack of or deficient structural system.
Insu ram is an easily replaceable self cooling brick through its unique openings that allows the internal passage of the wind. The brick is intended to enhance the local economy by training the community to manufacture product with a modified cinva-ram. A machine developed by Interamerican Center for Housing and Urban Planning (CINVA) at Colombian National University years ago.

**DIMENSIONS**
- Length: 22cm
- Width: 9cm
- Height: 18cm

**WEIGHT**
- 4kg approx.
- May change depending on the type of earth used and its humidity level.

**MATERIAL**
- Earth, mud, clay, dung, natural fibres, Site biomaterials

Rough texture on the outer side that generates micro-shading and leaves less surface area exposed to radiation.

Iso-diametric holes of different sizes allow air flow into the system and regulate the temperature.

Protuding volume to fit

CINVA RAM: allows to make compressed blocks in a standardized way.
Insu-ram is inspired by two different kinds of beetles.

1. Ground family: make a process called sclerification, which is about hardening the outer cells to generate a protective layer.

2. Dung beetle: Are beetles that feed on feces.

These cells increase their density towards the outside generating a rigid layer that insulates them from heat and decreases towards the inside, allowing the passage of fluids.

Dung beetles tear off portions of the dung and, with their toothed paddle-like front legs, pile them up to transport them some distance to the site where they have dug a subway gallery to bury them.

The excrement mixes with the soil and the sphere consolidates.

Manure as a binding material.
CUSTOMER PROFILE

We principally target to governments and nonprofits organizations.

Goverment
It is the entity in charge of providing housing and necessary equipments for all population.

Non-profit organizations
Many of these organizations make constructions for the most vulnerable communities.

These organizations require the construction of homes and equipment, safely, at low cost and that contributes to thermal comfort. Insu-ram can provide these features.
- Same biomimetic principles but with a better structural performance.
- Less risk of damage
- More compact
PROTOTYPING
The same procedure was performed with 3 different types of earth: Clay earth, silty earth and mixed earth.

NEXT STEPS
- File for a patent
- Finish and testing prototypes to maximize the structural and thermal capacities of the model
- Search for funding: 5000 USD
- Market the solution to our customers
- Invest on a modified Cinv-Ram and create a protocol
- Trained team to ensure the quality of the bricks made in rural areas
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