**HOUSE4226**

**HOUSE FOR TWO TO SIX PEOPLE**

the self-fab growing house for growing families

The SELF-FAB H-4226 HOUSE is a prefabricated and energetically self-sufficient house. Its construction is based on the use of new digital technologies and is especially flexible to allow the owner design it and build it himself.

1. With this project we are trying to break the traditional line between the buyer, the builder, contractor and the real estate promoter. And besides this, the SELF-FAB H-4226 HOUSE is a provocation concerning the role of the architect in a contemporary society. With the increase of new technologies, as standard cut pieces and prefabricated structures or modules, an easy access of the general public to them, the time and costs of production in construction scenarios can be dramatically reduced.

2. At the same time we are seeking solutions for the problematic of rural abandonment in the south of the Peninsula Iberica. The idea of the major cities, as long with the climate changes, and the abandonent of the rural practices are transforming the rural landscapes in deserts. The hybrid character of this project – somewhere between the mobile and the static – reinforces the flexibility of the stereotyped idea of mobile or urban place. The SELF-FAB H-4226 HOUSE, although works in the sense of a shelter, is conceived to create rural communities and therefore micro-cosmos of semi-urban life at the countryside. The non-definitive character of its constructive method generates a larger flexibility of disposal and time of permanence.

3. Based in both purposes the SELF-FAB H-4226 HOUSE tries to be a common and reasonable option for those who pretend to leave the city and live in rural communities. Far from the traditional construction process, these housing units can be built at an affordable and less expensive price.

**SELF FAB CONCEPT**

Automatic design and self-constructed process.

The principle of the house is generated by a section line -> a contour line. The client can draw a section line that fits more or less the measures of the cutting pieces machinery. Once the contour line is defined, the cut pieces are made from a synthetic material. Although the contour line differs from one to another, the number of pieces is always the same, and its way of assembly has to be always the same. The kitchen and sanitary modules as the support base, the underground structure attached to them, the bottom and above-mentioned structures, the floor panels, the external panels (interior and exterior), and the photovoltaic skin/shell are predesigned.

**EXPANDABLE CONCEPT**

In order to obtain a larger flexibility from the users, the SELF-FAB H-4226 HOUSE was developed to allow its expandability. While the family grows, the house can grow along with it. With the Self-Fab flat from the initial section line, more pieces can be fabricated and therefore expand several square meters of the actual living space.

**SELF SUFFICIENT CONCEPT**

The house is energetically supported by solar and wind energy. The water supply is guaranteed by the water reservoirs which storage rain water. The domestic water is filtered by an osmosis filter and the non-filtered water is used for irrigation of the vegetable garden and for the livestock animal care. The larger amount of energy comes from the photovoltaic skin. A special material composition made of four different layers: 1) the finished plastic interior, 2) the thermal and acoustic insulating, 3) the impermeable protection, 4) the photovoltaic texture. For the specific case [H42], (house for four people), the Photovoltaic Skin (PS) is 85 m² with 80% of opacity. With a 30° angle pointed south, the PS generates approximately 9520 kWh/year.

**COMMUNITY**

In a self-fab community the users can share and therefore improve common equipment and tasks. Besides the technical equipment that provides self-sufficient resources to their own houses, the community members can add new water tanks and wind turbines for community purposes and services. They can also maintain orchards, vegetable gardens, bio-mass fields and larger animal livestock.

**SITE LOCATION**

Although the Fab H-4226 HOUSE is designed to operate, based on the climatic specificities, in all the southern Peninsula Iberica, the specific site location for the implantation of the prototype is at the open country - 8 km distant of the 5th island's centre village (population 800). This village is located in central province of Alentejo, Portugal.

**SITE PLAN FOR CASE [H44]**

- House for four example
  - site plan legend:
    01. the house
    02. water tanks
    03. vegetable garden
    04. animal shelter
    05. wind turbines

**ASSEMBLAGE PROCESS FOR CASE [H44]**

- design your house, build it yourself
- the five steps to assemble the house for four

- step 01: place the foundation on the ground and anchor it to the kitchen and sanitary module
- step 02: place the external panels and the bottom structure aligned
- step 03: place the abode structure and apply them to the photovoltaic steel plates
- step 04: place the floor panels, the external panels and assemble the storage compartments
- step 05: place the interior panels and apply them to the photovoltaic steel plates

**ASSEMBLAGE PIECES**

- wind turbine
- photovoltaic skin
- kitchen module
- sanitary module
- piece A1
- piece A2
- piece B1
- piece B2

**EXTENSION PLAN FOR H-4226**

**HOUSE FOR TWO TO SIX**

- YEAR 2007 - HUSBAND AND WIFE HOUSE FOR TWO [H42]
  - AREA 41.44 m²
- YEAR 2009 - THE COUPLE AND TWO CHILDREN HOUSE FOR FOUR [H44]
  - AREA 63.56 m²
- YEAR 2014 - THE COUPLE AND FOR CHILDREN HOUSE FOR SIX [H46]
  - AREA 95.54 m²

**and expand it as your family grows**
HOUSE4226
HOUSE FOR TWO TO SIX PEOPLE
the self-fab growing house for growing families

THE SELF-FAB K:4226 HOUSES COMMUNITY
In a self-fab community the users can share, and therefore improve, common equipment and tasks. Beside the technical equipment that provide self-sufficient resources to their own houses, the community members can add new water tanks and wind turbines for community purposes and services. They can also maintain orchards, vegetable gardens, bio-mass fields and larger animal livestock.

ENERGETIC DIAGRAM
the energetic diagram shows the energetic plan used in this version
House for four people (H44)
HOUSE 4226
HOUSE FOR TWO TO SIX PEOPLE
the self-fab growing house for growing families

LEGEND:
01: water tank
02: osmosis reverse manual filter
03: wind turbine
04: eolic generator
05: eolic energy inverter
06: photovoltaic skin
07: solar energy inverter
08: batteries
09: organic garbage depot
10: recycling depot
11: compost bin
12: animal shelter (sheep)
13: vegetable garden
14: plastic water gutter
15: storage

PHOTOVOLTAIC SKIN
the skin is made of four different layers:
1. the finished interior
2. the thermal and acoustic insulating
3. the permeable protection
4. the photovoltaic texture

In the specific case (H44), the Photovoltaic skin (PFS) area is 85 m² with 80% of opacity. With a 30° angle pointed south, the PFS guarantee approximately a 9520 Kwh/yr.

ASSEMBLAGE OF ONE SELF-FAB HOUSE
members of the community assemble a house for four people

SELF-FAB HOUSE [H44] FULLY ESTABLISHED
the vegetable garden in use, the animal livestock, the energetic resources from the photovoltaic skin or the wind turbines guarantee a strong autonomy to the family.
Cukurova Shelters
A self-sufficient self-fabricated housing programme for seasonal workers of Cukurova Plains

What kind of a place is Cukurova?
Cukurova is one of the biggest agricultural regions of Turkey, with great production amounts of cotton and corn. Cukurova plains have the characteristics of Mediterranean climate, which means hot and dry conditions at summer while the winters are warm and rainy.

Who are these seasonal workers?
Generally at harvest time, fertile Cukurova Plains welcome extra man power despite inadequate living prospects to offer to seasonal workers. This inconvenient occasion leads to a difficult struggle of seeking refuge which seasonal workers are made to face with deficient possibilities. The seasonal workers who are pastoral farmers, come from nearby regions to the east, they have crowded families, also children usually contribute to the work on the fields. Unpleasant living conditions contribute to even worse distribution of public services. A bid to arrange the proper housing for these people is one of the leading actions can be taken to improve their current life quality.

What is all this project about? What does it have to offer?
This is not a global, international, even-tube, portable, fixed module, finished proposal. Instead, it is a local, vernacular, flexible, based on environmental inputs, and only for seasonal workers of Cukurova plains. It is a special combination of materials around gathered up to be something to take refuge in...

Phase 1
Let me in

Dig up a wall
Fence your wall
Watch your step!
Collect some stones
Let some fabric between

Two plane wall openings are advantageous for several reasons, circular form is more sheltering than its square shape it can be shaped with pipes when the wall is being prepared

Assumed usage rates in a year

Local advantages
The income of the user profile here is based on daily payment, that is why the project has to be gradually built, where every phase must answer some necessity with a priority sequence. It is assumed that as the time goes by the users can invest a little more of their very limited earnings to their shelters for a better life quality.

Since all will be built by the users themselves, the project must take their abilities and opportunities into consideration. Thus adobe is selected to be main vertical structural and envelope system. The users are assumed to have access to very basic agricultural tools like plow, shovel... also naturally they are considered to have a close relationship with soil. The site has access to trees where the secondary structural components will be acquired from. To avoid loss of trees, wooden components are designed to be with minimum sections so that branches and twigs can be used instead of cutting trees to get large sections of trunk wood.

Infrastructure
The project promises to generate limited amount of electrical energy from solar and wind power. Water is assumed to be collected from watering pipes of the fields. Sanitation is assumed to be taken care of with communal WCs and baths.

Materials to be used for the first three phases

Earth (sun-dried or burnt), adobe, brick, stone, wood, plastic and metal. The materials are selected based on their availability, cost, and environmental impact. Adobe is used for the main structure, brick for the external walls, and stone for the foundations.

Specifications

- Permanent: Not permanent
- Cost: $500
- Area: 50 sqm
- Height: 2.5 m
- Roof type: Flat roof
- Construction method: Adobe
- Foundation: Rock
- Setting up: Assembly
- Location: Field
- Support: Self-supporting
- Durability: Long-lasting
- Maintenance: Low maintenance
- Users: Seasonal workers
- Sanitation: Communal WCs and baths
- Water source: Watering pipes
- Electricity: From solar and wind power

Lamps

- Recommended: Lamp 16W pre and cooler 14W
- Lamps: 4 lamps and 1 cooler

Economic

- Construction cost: $500
- Maintenance cost: Low
- Running cost: Low

Environmental

- Site impact: Low
- Material impact: Low
- Energy impact: Low

Social

- Community involvement: High
- Accessibility: Easy
- Safety: High

Architectural

- Aesthetic: Simple
- Functionality: Efficient
- Space: Open
- Light: Natural

Energy

- Solar panels: 150W
- Wind turbine: 1kW
- Battery: 12V, 100Ah

Water

- Water source: Watering pipes
- Water usage: 100L/day

Conclusion

This project is a sustainable and affordable solution for seasonal workers in Cukurova Plains. It combines the use of traditional materials and techniques with modern energy sources to provide a comfortable and functional living space.
electricity generation and system detail

- Daytime electricity generation: Batteries are fed by users at work.
- At night, electricity usage: Users at home.
- Southern adobe wall acts as a thermal mass for ventilation and helps store energy.

- Vertical fan:
  - EVT: Warm air from shaft
  - Vertical fan: Battery operated

- Bicycle dynamo:
  - Electric cooler
  - Fluorescent lamps

- Horizontal fan:
  - More generation devices can be fed like radio, tv

- Vertical fan:
  - More horizontal fans are used for ventilation.

- South facade:
  - Dense and cool air (north and evaporated)
  - Air movement due to density and pressure difference

- Night view of Çukurova shelters: Northern facade

- Solar gain:
  - Some branches for tin plates coming; we have at least two supposal from cantilevers and wooden beams
  - Solar gain: Some more adobe over the cantilevers

- Vertical fans:
  - They vacuum the air
  - Vertical fans introduce more functionality to the shelters.

- Reservoir:
  - Air movement due to density and pressure difference
  - Reservoir: Water reservoir

- Natural stone foundation:
  - Wire to connect with fence

- Scale: 1:50
Sanitation, communal baths and toilets

- Water is piped from watering pipes of the adjacent fields at several times of day and reserved at reservoirs in front of each house for evaporation and cooling.
- Knitted straw protect water from being polluted while a nylon sheet can be adapted for inner covering of reservoirs to prevent leakage.

Toilets and bathrooms are communal because:
1. More practical, since there will be less need to dig and that will contribute in knowing the experiences of others.
2. Culturally, in the traditional houses toilets are always outside the main building, that may be because of the importance of having clean for baths, hammocks (purihita baths) are always something more than just to be washed; they are places to gather and socialize. In this project each house is adapted to public places to appear to the cultural background of people.

Hamram
- Less openings more approached to the hot room
- The hamram can be used in turns by men and women on different days of the week as it is still done in hamrams all over the country.
- Pooled or painted banks of water inserted into the southern wall are hot water reservoirs.

Desired visual privacy can be fulfilled with fabric or sheets placed along the beams.
IDEA AND CONSTRUCTION

Building a house is a very intimate process. Firstly, a man approached this subject using light framework construction, which was filled afterwards, because the man was set on time. The idea of our project was to create a building, which man could quickly build by himself as well as pull down and relocate. In order to this idea we used a triangle which is a statistically unchanged as a result it is construction independent. The construction consists of light prefabricated elements which are easy to transport and montage. A frame of the network is filled by triangular elements, which are able to montage according to self invention.

CONSTRUCTION SYSTEM DETAIL

THE SELF - FAB HOUS3

CONSTRUCTION STAGES
ENERGETIC SYSTEMS

The face of the elevation, which is exposed to intensive solar radiation, is for the most part transparent, while in the rest of the building we propose whole walls to reduce energetic loss. The only thing that this object needs to be efficient is a connection to water source. Our object has its own wastewater treatment plant. The problem of gaining electrical power has been solved by using an innovative solar system developed by New Jersey Institute of Technology, which covers all triangulars in the elevation. In the building we use very efficient slit ventilation.
The Project because of an constructional system adjusts to individual needs and fancy of future residents. A very important fact is an ability of creative action in order to adjust oneself's fantasies to a block of the building. It is achievable thanks to a changeable design of an elevation. Established modular system enables to determine size of the building and freely shape its structure and functional set-up. The elastic construction of building provokes us to consider the architecture which is easy to build. It enable to raise not only the single building or conglomeration of these buildings but also to create more complicated structures which join themselves both perpendicularly and horizontally. The building thanks to its universal form and various abilities of self-sufficiency is able to be located on almost every place of the world, regardless of the climate, and its resistant construction is able to endure regardless of rain, snow or earth-quake.

We divide small area of this building into zone, marked out centre with using glass cube. The atmosphere in this room is crossing our mind to ancient the roman compuivum, where is run domestic life around.

THE SELF - FAB HOUSE
The Chill River Valley is located between extensive urban degraded areas with a decontrolled growth, a real threat for its destruction, because the city has given the back to the River all the time. The location presents two significant activities: the agriculture and the tourism.

The main strategy merges these work sources like an unique organism, inside of an extend net of interdependent symbiotic nodes (INJA), applicable for other agricultural zones in Peru.

So the CHICAMBOER (Urban farmers) and the tourism work together in all phases of development (planning, design, self-manufacture and assembly of the model). The building is conceived as an extension of the landscape, and is made with tecnics, materials, and tools taken from the local context.

The structures and envelopes are 100% recycled and reused, changes according to climate variations or number of inhabitants. The entire structure is a big system of heating and cooling like a biological radiator with 100% of Lo-tech performance.
Bayanihan is a Filipino word derived from the word “bayan,” meaning town, nation, or community. Bayanihan literally means “Being a bayan,” and is thus used to refer to a spirit of communal community and cooperation. This is most clearly displayed in the old tradition of neighbors helping to relocate a family by getting enough volunteers to carry the whole house, and literally moving it to its new location. Since the nipa huts are now being replaced by concrete houses, this tradition is slowly disappearing.

To enliven the spirit of bayanihan, today’s design and building of dwellings must be rethought. The house of today must be a model for sustainability, prompting us to develop not a design, but an archetype of a self-sufficient house. The prototype shall have an internal layout and configuration geared toward efficiency through good lighting and ventilation. The areas generally classified into two groups, namely “living spaces” and “warm spaces.” Living spaces refer to the living and sleeping areas where a certain degree of comfort required is higher. The warm spaces can be described as the work areas that generate heat and humidity, such as the kitchen and the laundry areas. The configuration works by grouping the “warm spaces” on one end and the “living spaces” on the other. The “warm spaces” should open up to a large opening where it will be constantly vented. This causes a pressure imbalance in the interior, which then creates a suction effect at the “living space” that then pulls in fresh air. The effect is enhanced by raising the “warm spaces” and using the roof and the atrium/ten as catalysts. There is an option to reuse gray water in a reservoir below the level of “warm spaces,” collected from the laundry area located above the comfort room. This prototype can be used in any part of the globe that only requires minor modifications. Tropical regions can raise the floor of the “living spaces” and utilize slatted flooring that enhances the ventilation effect further by providing cool moist air from the ground. The raised structure, aka nipa hut also minimizes building footprint. Extensions for eaves address rainwater. For and against the house rests on the ground. The space underneath the “warm spaces” can be used as an extra room, since it shall be enclosed. In the cooler regions, extensions and raised structure can be eliminated, provided that the configuration of “living & warm spaces” is followed.

Objective:
- Decentralize Production & leave it to the hands of the occupant & builder thereby maximizing potential
- To address a Worldwide Environmental issues through sustainable housing and promote a subconscious environment friendly lifestyle

Movement Bayanihan (Distribution):
- Universal Logical Symbiotic instruction to eliminate language barriers
- Magazine, insert, electronic media, web, print, photocopying, Exposure through Product Packaging, Email, Spamming! Shopping Bags, Advertisements, Billboards, etc.
- Human Scale equipment
- Derived anthropometric design open to parametric customization relating to human dimension regardless of size or built
- Modular construction with options for expansion and climate in reference to geographical location
- A non-traditional single family dwelling unit reconfigured for good air change and day lighting
- Simplified energy-saving design that is easy to effect
- Designed to be spread as 2 sheets (minus the concept sheet) (cut sheet 2 can stand alone for mass distribution)

Effect:
By decentralizing production and distribution, the “INSTRUCTIONS” work at the user level, reaching a wider range of people that even rural and remote areas will be able to follow. Utilizing local construction methods, and the materials available to them, it shall minimize additional costs and eliminate the bottleneck at the production level. By “localizing” construction, the houses produced would be inherently of the local materials suitable for the local climate of the user. This way, we put vernacular construction practices in context. Design is generally low-cost, to popularize its use in rural and marginalized communities to aid in living economically and environmentally friendly. If this prototype is accepted by many, there will be dramatic implications on sustainability and self-sufficiency, beneficial to developing countries such as the Philippines.
The Institute for Advanced Architecture of Catalonia (IAAC) is issuing an INTERNATIONAL COMPETITION for architects, students and designers from around the world for proposals for the construction of self-sufficient dwellings in which the emphasis will be on exploring people's capacity to construct their own homes especially through the use of digital technologies.

Please visit www.iaac.net for further information.

RULES AND PRIZES

A. Eligibility
The competition is opened to all professionals, designers and students of architecture, urban design and landscape design.

B. Free Competition Registration
No fee or other payment will be required of those entering the competition.

C. Awards
The prize (total value: €39,500.00) will be distributed at the discretion of the juries following the bases’ scheme. Honorable mentions by country: Net, Delegates.

D. Digital Submission
The submission is digital through the website. The proposals must be displayed in THREE (3) PDF files in a DIN A9 size.

JURY MEMBERS

Vicente Guillarti, Director
Willy Muller, Development Director
Lucas Cappelleti, Director of Research
Marta Male-Alemany, Technology Director
Alejandro Gutiérrez, Chile
Yung Ho Chang, China
Behrokh Khoshnevis, USA
Ben van Berkel, Netherlands
Bojan Vuga Raducz, Slovenia
Branko Kolarevic, Serbia
Brett Steele, UK
Greg Lynn, USA
Ignasi Pereu, Spain
Izaskun Chinchilla, Spain
J.M. Lluís, Taiwan
Josep Lluís Mateo, Spain
Julio Gasta, Uruguay
Michel Rojkind, Mexico
Neil Greenshields, USA
Ramón Prat, Spain
Turi Flavbrandt, USA
Young Joon Kim, Korea

CALENDAR

Closing date for registration: September 17th 2007.
Enquiries: All the grouped replies to these will be posted on the website before August 15th 2007.
Submission of Projects: The submission of projects will close on Tuesday September 18th 2007.
Selection: Selection of projects by the national jury: September-October 2007.
Results: Announcement of the results: October-November 2007.
International presentation of the results: November 2007.