


'Solis Ortus' - Gabriel Residence

by narein perera / 2016-07-03 04:20:11 / Internazionale / 16338 / EN



New Construction

Green Building
Solutions Awards 2016
SRI LANKA
Energy & Hot Climates

Primary energy need :

15 kWhpe/m².year

(Calculation method : Primary energy needs)

ENERGY CONSUMPTION

Economical building *Building*

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Energy-intensive building

Building Type : Isolated or semi-detached house
Construction Year : 2013
Delivery year : 2014
Address 1 - street : 10120 BATTRAMULLA, SRI LANKA, Sri Lanka
Climate zone : [Af] Tropical Wet. No dry season.

Net Floor Area : 395 m²
Construction/refurbishment cost : 182 000 €
Number of Dwelling : 1 Dwelling
Cost/m² : 460.76 €/m²

Proposed by :

General information

“Solis Ortus” - my rising of the sun

Home for Harin and Mihiri Gabriel, at Pelawatte

“Solis Ortus” – a Latin phrase, meaning “my rising of the sun” - was one that was articulated by the home owners, in their approach to defining the quality of living spaces they envisioned in building their home. The phrase taken literally as well as metaphorically established the stimulus for the Architect’s approach to place creation. “A place that would not age, with no roots to a particular architectural style. Rather, to have them draw upon the natural rhythms of the day - like the sunrise – which at each occurrence, brings new hopes, new beginnings. Spaces that are connected to nature, the sun, the sky, the wind, the rain - always changing, never the same at the next dawn. Yet, spaces that are secure and consistent in their function as the first light of the day that breaks through the darkness”.

The overwhelming questions that confront the architect are – How can we connect to the outside in sites deeply embedded in the urbanised and rapidly urbanising “grid” of Colombo and its suburbs? Can we integrate daylight without the heat and the glare? Can we ventilate without the dust and vehicle emissions? Can we create vistas and access to the outdoors without compromising safety and privacy? These questions are at the core of building sustainably in Tropical Asian cities, questions that need attention, lest we make our cities worse, adopt approaches that will otherwise give birth to an “Air conditioning Armageddon” (Emmanuel, 2015) in our future cities.

The conceptual approach to the creation of spaces that can overcome the negativities of building in the urbanised tropics was one of "Layers". Layers that look to distance and isolate. Layers that filter and insulate. Layers that protect and create freedom. Ultimately – layers that welcome "the rising of the sun". The layered approach emanates from the zoning of site and spaces, right down to the minute detail, thus, each level of intervention is deemed essential to the whole.

Layers that Distance and Isolate

Living happens in spaces that are zoned between two or more of the large, open to sky spaces of the house. The open spaces – gardens and courtyards – ensure and enhance the possibilities for natural light and ventilation. They also distance these spaces from the external edges of the site. This allows for the experience of the world beyond the confines of the site, albeit without direct interaction, rather, only through these open spaces. Although, at first glance the planning of the house seems introverted, at deeper analysis shows otherwise, with its connections to the sky, the trees, the roofscape of the city beyond, all crucial to the act of place making. Essentially creating places that transcend their physical boundaries.

Layers that filter and insulate

The gardens and courtyards also serve to filter and insulate the living spaces from the negative effects of the outside. Extensive planting serves as the primary means of filtering, generating a layer that traps and conditions the heat and air passing through them, forming possibilities for evaporative cooling. The planting is intensified and the edges that separate the inside from the outside. Tendrils of climbing plants allowed to cascade down creating green veils or the dense canopies that shade the walls, roofs and windows, redefined the shape of spaces established by the built structure. They produce a natural envelope that touches all senses, yet it is never static, thus, imbued with the ability to amaze and delight.

Layers that protect and create freedom

Protective layers, in particular the aircrete block screen wall on the street edge and bamboo tat screened steel grilles create a further envelope at the edges of the open spaces, allowing almost all of the living, eating and sleeping spaces to be almost devoid of formal doors and windows. The space flows unimpeded both horizontally and vertically, again expanding the physical space to encompass experiential combinations that the home owner has the liberty to control by the act simply opening or closing a tat screen. These layers also shield the gardens, courtyards and therefore the interior spaces, both physically and visually, granting the young children the ability to explore their surroundings in freedom and safety.

Primarily the spatial connections made are envisioned as those that link architecture to natural phenomena and therefore to essentially place making, a discussion at the heart of architectural thought. Places that create the atmosphere of home. This was the homeowners' prerogative - to "gift" their children the "rising of the sun".

See more details about this project

http://tropicalbuildings.org/case_studies/92

Stakeholders

Stakeholders

Function : Structures calculist

Eng. Keerthi Ratnayake

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Quantity Surveyor

Function : Construction company

Saman Gamage

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General Contractor

Contracting method

General Contractor

Type of market

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If you had to do it again?

Two years on, the single factor highlighted in the use of the home, is a single mechanically conditioned room. This too as a temporary measure to keep sound out,

and also as an extra protection from tropical insects.

Building users opinion

The connection between inside and outside is the appreciated factor in the residence. The blurred edges in / out are a welcome feature.

The naturally conditioned home, is used as envisioned for over two years now. Though thermally comfortable, there was a need to insulate a single room for sound and tropical insects, for the benefit of a new born.

The minimalist approach to architectural space is welcomed and the spaces remain uncluttered with furniture, enhancing its conceptual approach - as shaded pavilions that connect to the outside.

The post occupancy evaluation took the form of informal discussions, and continued advice sought by the occupants.

Energy

Energy consumption

Primary energy need : 15,00 kWhpe/m².year

Primary energy need for standard building : 13,00 kWhpe/m².year

Calculation method : Primary energy needs

CEEB : -0

Envelope performance

Envelope U-Value : 1,70 W.m⁻².K⁻¹

More information :

Walls

Exterior walls are made of exposed brick 225mm thick. The load bearing brickwork adopt the rat-trap bond in its construction. This ensures an air gap that promotes insulation of the spaces by the envelope. North facing air-crete block screen wall provides both security and shade to the major habitable spaces. The perforated wall allows the free movement air to the internal spaces.

Doors and windows

The fenestration takes the form of openings devoid of windows/glazing. Instead are sheltered using bamboo tat. Selected areas use timber louvered, sliding folding sashes, that allow ventilation and also the possibility to open fully.

Flooring

Interior floors are finished with cement floating, cut and polished. Exterior areas use random rubble paving on compact soil fill, with gaps that allow grass to grow in-between and water to penetrate into the ground.

Roofing

The roof is made of insulated profile steel sheets, that includes a timber ceiling. The roof is covered with series of solar panels. Solar panels also serve as a protective layer reduces the direct heat gain from sun. The wing that have the long sides east/west have a flat roof, that includes a minimum of 300mm of soil and extensive planting to insulate and shade.

Users' control system opinion : no control systems adopted

Renewables & systems

Systems

Heating system :

- No heating system

Hot water system :

- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Natural ventilation

Renewable systems :

- Solar photovoltaic

Solutions enhancing nature free gains :

Extensive shading - using double skin facades, cavity brick walls, shading overhangs, shading screens and vegetation in context and on the building envelope. The insulated roof, further shaded by the solar PVs and solar hot water systems are significant.

Urban environment

The most creative approach in the design is the integrating the site context with the building. The parameters of the urban context and the definitions of the residential house was clearly understood by the architect and he has used the land edges as boundaries to zone the street and residential site. Protective layers, in particular the aircrete block screen wall on the street edge and bamboo tat screened steel grilles create a further envelope at the edges of the open spaces, allowing almost all of the living, eating and sleeping spaces to be almost devoid of formal doors and windows. The space flows unimpeded both horizontally and vertically, again expanding the physical space to encompass experiential combinations that the home owner has the liberty to control by the act of simply opening or closing a tat screen.

Land plot area : 840,00 m²

Built-up area : 35,00 %

Green space : 721,00

Products

Product

external envelope - brick walls and aircrete block screens

local industry

samanbgamage@gmail.com

<https://www.mrt.ac.lk/web/staff/dr-narein-perera>

Product category : Table 'c21_italy.innov_category' doesn't exist SELECT one.innov_category AS current,two.innov_category AS parentFROM innov_category AS oneINNER JOIN innov_category AS two ON one.parent_id = two.idWHERE one.state=1AND one.id = '6'

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The natural finish of the materiality of the building envelope is one that is deemed timeless; that enhances the natural rhythms of the day; the low maintenance, and a reduction on the life cycle cost is positively accepted. The envelope that encompasses extensive vegetation as a part of the whole completes the conceptual approach.



Costs

Construction and exploitation costs

Renewable energy systems cost : 9 500,00 €

Total cost of the building : 182 000 €

Carbon

GHG emissions

Building lifetime : 50,00 year(s)

Contest

Reasons for participating in the competition(s)

Sri Lanka has a rich and ancient tradition in building, most importantly, building in ways appropriate for climate and context. It is important for contemporary Sri Lankan architecture to build appropriately for this region, adopting proper technology and materiality, incorporating passive design strategies for natural light and ventilation, thus imbue each building with a place specific response and identity. Sustainable architecture was always ingrained in Sri Lankan architecture, where building was always done with sensitivity to its tropical context and its people. Approaches that embrace these factors are key and should be encouraged.

Building candidate in the category



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Users' Choice Award

