Breathing House - Modern Saudi House, Riyadh, Saudi Arabia

Project data

Type of project: Architecture (housing)
Not forseen

Start of construction:

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Comment of the Holcim Awards 2005 jury for Africa Middle East

Deserving special merit, the project demonstrates an environmentally responsive design that is informed by traditional Islamic and cultural principles. Successful is the maintenance of cultural context while at the same time achieving a contemporary tectonic expression. Equally noteworthy is the prototypical approach (rather than site-specific) toward transforming the values of local culture into a modern architectural expression. The external context within the Islamic world is the size of the site and the selection of materials. The project makes the design appropriate for environmental demands as well as customary privacy hierarchies. The work shows an accomplished degree of skill in creating fluid transitions between indoor and outdoor spaces.

Relevance to target issues (by author)

Quantum change and transferability

A building is considered sustainable according to how well it integrates with the natural elements of the surrounding landscape and with the habits of its inhabitants. This thought has been the springboard for designing a "house system" in which the respect for privacy, the energy saving features of the building and the integration with the surrounding environment blend together. This project is born out of the demand to meet the need for new houses for typical Saudi families (7 members or over). This need implies the possibility - in the future - to expand the building by means of a compressor. The "breathing house" will become the essential element of a whole urban puzzle.

Ethical standards and social equity

This house fully blends with the Saudi life style, under a contemporary view. A fundamental aspect has been the respect for local traditions, for instance by separating the men's living area and that of women, or by clearly defining between areas dedicated to guests and those for the family. The use of wide-spread building technologies will have a positive economic effect on the local community.

Ecological quality and energy conservation

The almost total energetic self-sufficiency of the building is guaranteed by a "combined effect" of natural ventilation, photovoltaic cells and geothermal technology. The Union of these three systems guarantees a saving or a production of electric energy adequate to satisfy the needs of the house. The materials employed are produced locally, they are long-lasting and wholly recyclable.

Economic performance and compatibility

In the light of the type of materials available locally and the easy assembly of the building site in order to keep costs down and exploit non-specialised local workforce, the choice has been oriented to a steel bearing structure covered with concrete, stone and plastered bricks. It is expected that this type of house can be purchased by a family with a per capita income of $27,000 US dollars.

Contextual response and aesthetic impact

The external aspect of the house reflects a strong demand for privacy, combined with the need to establish a formal dialogue with the local tradition but under a modern light. The external surfaces will probably require a very limited degree of maintenance, guaranteeing both long durability and a general high aesthetic level.

Project description by author

The "breathing house" concept not only refers to the exploitation of natural ventilation for the wellness of its dwellers, but also to the absorption - just as a lung - of the different though complementary energies present in nature (aeolian, solar and geothermal).

The initial idea has been that of exploiting the local winds coming from north-east and north-west for the natural ventilation of the building. The main entrance is located on the first floor, from here through a long suspended peripheral corridor one enters the two main rooms of the house, i.e. the male-guest room and the living-room (women-guest room).

And it is just such main corridor that works as the "wind collector," designed to take advantage of the "Venturi effect" (the acceleration of wind in a duct) and distribute fresh air inside the house. Moreover it also allows for the privacy of both dwellers and guests. The use of natural ventilation has been conceived as part of an "integrated system." A wall-mounted coil provides both heating and cooling. In the summer the cooling system is driven with the electric current produced by a photovoltaic system positioned on the brise soleil of the whole building, while in the winter the system uses a geothermal (thermodynamic) heating system placed 60 cm under the floor of the internal courtyards. The latter exploits the calories accumulated on the ground and in the water of the swimming pool by irradiation during the day, and then transmits them to the building by means of a compressor. The integration of all these systems permits an energy saving of 75% compared to traditional systems.

The construction technology adopted is founded on a steel bearing structure that is assembled at a plant in order to reduce labour costs. The external panelling is based on a double skin facade ventilated by an interstitial air cavity. The external layer is in concrete, which can be natural, plastered or stone-covered, while the internal one, more breathable, is in plastered bricks. The steel-beam ceilings can be covered by a concrete casting over a fluted sheet metal frame. A further expansion of the building has also been conceived within the "breathing house" concept, as the house - just as a lung - is subject to an increase in volume for vital needs.

Therefore a future enlargement has been envisaged on the ground floor with the dining room and the kitchen, as well as extra room for cabinets, and on the roof floor by exploiting the terrace to increase the number of bedrooms. In all cases there is no need to intervene on the bearing structure of the house.