

Environmental design studio design for Arriyadh, Saudi Arabia

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Working, designing and educating in the Middle East bears a particular challenge due to the different environmental conditions.

Extreme temperature of up to 50 degrees C in the summer by over 80% humidity, standard contemporary textbook solutions do not apply. Most of the built environmental design guides and examples come from either European or American and in some cases Australia.

Students were asked to develop a model for future housing in Arriyadh, Saudi Arabia. The proposed design should accommodate 7 members of typical Saudi family. The house design should ensure sufficient garden space to ensure the possibility of a well balanced house and estate design. The floor area requirement lay between 220-250 sm, since this is about the average floor area of a typical Saudi home. The students were encouraged to develop innovative solutions regarding their environmental design of the housing units and estate plan.

Case study of studio design projects demonstrate built environmental concern in hot desert environment in Arriyadh, Saudi Arabia.

These projects were supervised by Prof. Florian Techel, Prof. Mehdi Sabet and myself (Dr. Gisela Loehlein) we further collaborated interdisciplinary wide with Prof. Claude Berube, interior design and Prof. Shoaib Nabi, multimedia design all at the school of Architecture and Design, American University of Sharjah, UAE.

Selected three different projects by the following students:

1. Abdulla al Shamsi
2. Amin al Saden
3. Loubna al Zayek

The project designed by Abdulla al Shamsi, explored an adaptation of traditional techniques and systems into a modern house. ...'The structure is designed in a way that three structural axes rotate around the central courtyard. The structural system allows for future with ease. Exploded axonometric showing ways in which spaces can be ventilated naturally when the weather allows for it, hence reducing the use of non-renewable energy on the long run. The system can be used with units facing or opposing the wind direction due to the massing of the units. The system can be enhanced by fans and filters as shown in the diagram.'... (Al Shamsi, 2003).

The project by Amin al Saden focused on creat(ing) an innovative design solution based on a design concept that celebrates aspects of traditional culture and architecture, while looking towards the future in designing new housing units that meet tastes and expectations of a contemporary Saudi family. ... Working with the environment, not against it, to make optimum use of what it offers, such as natural light and wind'... (Al Saden, 2003).

The design of Loubna al Zalek focused on developing a house of the future for Arriyadh, Saudi Arabia....'Use of technology to create innovative spaces, is one of the feature that futuristic housing promotes in designing. One example of the use of technology, would be, the use of pre-fabricated mass produced materials. The major goal of future housing is the pursuit of an industrial produced but aesthetically rich and spiritually uplifting form of architecture... via the use of innovative materials that are environmental friendly.... To create an infrastructure (or an outer skin or membrane) that would

embrace all the residential units beneath (secondary membrane) and provide each unit with newly spatially experienced uplifting spaces. The major structure is designed to carry its weight, the membranes (skin of the unit), suspend the floor slabs and fit all the HVAC systems. ... Controlled outdoor spaces are also fitted under the main roof or skin of the structure. The aerodynamic shape of the infrastructure is designed in order to enhance air circulation and induce air currents (movement) within the structure. The innovative material that is used to build the membranes is mainly used to encourage the use of prefabricated mass produced structures that would only require assembly on site. Environmental control systems are creatively fit within the main infrastructure thus to ensure the sustainability of the architecture designed. By the combination of the two membranes (skins), a double skin façade technique is achieved. This feature ensures that each unit is passively control(able). Active systems are (situated) ...inside the (structural ... ribs, that span the outer skin and then the (service) ducts branch either through the cavity of the double skin or under prefabricated slabs. Although the cost of this future system is high, but on the other hand it makes the building an energy efficient building with low energy consumption and therefore a much lower load on mechanical systems. The design is to promote ecological high tech innovative materials and techniques in the construction of residential prototype with respect to culture. '... (Al Zayek, 2003).

DISCUSSION

The students in the class selected various design approaches, the one selected here can be seen as representative examples for the main approaches chosen by the class and which could be placed into the following categories:

- traditional adaptation;
- standard westernized system adaptation;
- challenging futuristic approach.

We had left the path that the students chose open and allowed them to develop their environmental design solution in accordance of the concept design, to ensure that these will be developed hand in hand. The lack of design data or guides regarding passive environmental de-

sign in hot arid environment and the focus on the western moderate climate design issues, where identified.

CONCLUSION

Three different approaches reaching for a traditional adaptation, standard westernized system adaptation to a rather challenging futuristic approach design managed all in varying degrees to ensure various degrees of passive environmental control system design. This project was a comprehensive building design studio –which had embedded within it the consideration of passive environmental design.

REFERENCES

- Al Shamsi, A., 2003. Design Programming Document, Design statement, Dec 2003.
- Al Saden, A., 2003. Design Programming Document, Design statement, Dec 2003.
- Al Zayek, L., 2003. Design Programming Document, Design statement, Dec 2003.