

Screens Design and Application for Sustainable Buildings

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Abstract : Traditional vernacular architecture in the United Arab Emirates constituted namely of adobe houses with a limited number of openings in their facades. The thick mud and rubble walls and wooden window screens protected its inhabitants from the harsh desert climate and provided them with privacy and fulfilled their comfort zone needs to an extent. However, with the rise of the immediate post petroleum era reinforced concrete villas with glass and steel technology has replaced traditional vernacular dwellings. And more load was put on the mechanical cooling systems to ensure the satisfaction of today's more demanding dwelling inhabitants. However, In the early 21st century professionals started to pay more attention to the carbon footprint caused by the built constructions. In addition, many studies and innovative approaches are now dedicated to lower the impact of the existing operating buildings on their surrounding environments. The UAE government agencies started to regulate that aim to revive sustainable and environmental design through Local and international building codes and urban design policies such as Estidama and LEED. The focus in this paper is on the reduction of the emissions resulting from the use of energy sources in the cooling and heating systems, and that would be through using innovative screen designs and façade solutions to provide a green footprint and aesthetic architectural icons. Screens are one of the popular innovative techniques that can be added in the design process or used in existing building as a renovation techniques to develop a passive green buildings. Preparing future architects to understand the importance of environmental design was attempted through physical modelling of window screens as an educational means to combine theory with a hands on teaching approach. Designing screens proved to be a popular technique that helped them understand the importance of sustainable design and passive cooling. After creating models of prototype screens, several tests were conducted to calculate the amount of Sun, light and wind that goes through the screens affecting the heat load and light entering the building. Theory further explored concepts of green buildings and material that produce low carbon emissions. This paper highlights the importance of hands on experience for student architects and how physical modelling helped rise eco awareness in Design studio. The paper will study different types of façade screens and shading devices developed by Architecture students and explains the production of diverse patterns for traditional screens by student architects based on sustainable design concept that works properly with the climate requirements in the Middle East region.

Keywords : building's screens modeling, façade design, sustainable architecture, sustainable dwellings, sustainable education

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