Abstract:

The number of tall buildings is increasing as a result of the advances in construction technologies and the rising land prices. These buildings are characterised by their high energy consumption compared to other building types as they rely intensively on mechanical HVAC systems due to the extreme weather conditions associated with the increase in height. However, they present a great opportunity for energy savings. In recent years, it has been noticed the increasing interest in geometry and form of tall buildings, as a result of the evolution of parametric modelling and 3D visualisation tools, on the expense of the environmental aspect. This paper discusses factors affecting the energy consumption in the tall buildings. Through an extensive analysis of Literature, active and passive energy efficient strategies adopted in tall building at various building stages are identified. In addition, the role of architectural design parameters, such as building form, orientation and envelope on the tall building energy performance are highlighted. Finally, a set of guidelines and environmental design strategies to be considered in different phases in order to achieve energy-efficient tall buildings are proposed. These strategies have been categorised into four stages namely early design, conceptualisation, and documentation and operational. A 3D modelling approach was used to visualise and illustrate the proposed strategies in different stages.

Keywords:

Energy efficiency, design strategies, tall buildings, visualisation

Published In:

Energy Procedia - ScienceDirect, 74 (2015), 1358–1369
EVALUATING THE IMPACT OF SHADING DEVICES ON THE INDOOR THERMAL COMFORT OF RESIDENTIAL BUILDINGS IN EGYPT

Ahmed AM Ali, Tarek MF Ahmed

Abstract:

The building and spaces shape have a great impact on indoor temperature. Well-Designed sun control and shading devices can dramatically affect indoor temperature. The thermal performance of internal spaces in hot arid desert is highly influenced by various passive design techniques, eg space dimensions, facade colors, fenestration ratio, glazing type; and vertical and horizontal shading devices. Simulation tools play an important role in taking decision during early design phase that could help in improving the thermal performance of buildings. The aim of this paper is to explore the impact of different shading devices on the thermal performance of residential buildings in Egypt. To achieve this aim of the research first, the climatic analysis of New Assiut City is introduced followed by identification for the prevailing residential prototypes within the city and the selected residential type. Second, the role of the used Performance simulation tool in enhancing the designs is highlighted. Finally, a simulation has been run for the selected residential site in NA City for the four principal orientations. The results of the study showed that the use of vertical fins have a indoor overhang reduced the temperature by 1.5 C for the temperature for the southern orientation.

Keywords:

NULL

Published In:

Proceedings of SimBuild, 5-1, 603-612