The Design Characteristics of Nature Inspired Architecture

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The structures, forms, systems and organisms in nature have been widely assisted engineers, designers and architects in finding the improved and innovative solutions. Every living organism and existing nature structures on earth represented a perfectly functioning as well as adapted to the environment as a result of the millions of years of evolution, and then architects and engineers try to obtain new design concepts and new innovative technologies from the miracle structures of nature biological system. The architects has inspired from the shape and function of nature in order to seek new architectural design sources from natural existing elements. The nature designs are inspired by pictures, shapes, mechanisms or organisms occurring in nature. This research is going to find out a way to optimize design concepts for nature inspired architectures, and then it will be investigate the existing buildings that include nature techniques and bio-eco nature-friendly buildings. The nature scene offers the new ideas to draw inspirations for design. When looking at trees, green landscapes, flowers, animals, mountains and other nature elements, designers can discover unusual perspectives, visually interesting forms, creative shapes and details. Organisms in nature can also help designer’s rethink, motion and mood in nature offer interesting shapes and creative design elements. Nowadays the most of cities are filled of buildings similar to supermarkets or box-like shapes. When planning for the future cities, architect should try to consider how to satisfy our yearning and aspiration for harmonious interaction with nature. All of these answers are related to our fundamental human emotions, it can be established whole relationships between buildings and nature for people.

The important part of this study is to analyse what is needed to help the architect to get inspirations from nature for the visual and conception nature-friendly building design, and to obtain innovative design elements and technologies from the systems and organisms of nature. The examples of creative design are mechanical characteristics of retractable cable structures inspired by spider web and curved shell structures inspired by sea shell and eggs. The study is to find out the new system of long span lightweight roof from spider web, and then obtain the optimum design curve from sea shell and egg. These nature inspired designs are shapes and technologies that are obtained to mechanisms in nature.

The author thinks that the nature inspirations lead to new strategies for discovering new design and technologies. Nature inspired models are a science that studies nature’s models for innovative technologies to solve human problems. Nature has an ecological standard to judge the rightness of innovation results. After 3.8 billion years of changes and evolutions, nature has learned what is effective, what is appropriate, what is optimal, and what is last. Nature is a laboratory in which life has evolved adaptations to the changes of its diverse environments. The nature organisms are the creative results that developed for equilibrium conditions in the environments of the Earth. The nature inspired designs are classified with three concepts. Visual inspirations are used to imitate designs or engineering technologies that share the similar appearance of nature. Conceptual inspirations are used to apply the knowledge found in design rules, principles or patterns. Computation inspirations such as algorithmic bio-inspiration are searching through nature to achieve the evolutionary results such as generative representations. The research is to find out design concepts that determine how to get inspirations from nature and how to apply new conceptual designs and technologies in architectural design.

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