Faculty of engineering
Architecture Department

Bio-mimetic approach for office buildings skin adaptable design

By:
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B.sc., Architecture
Faculty of Engineering, Ain Shams University

A Thesis
Submitted for Partial fulfillment of the requirements for the degree of
Master of Science in architecture

FACULTY OF ENGINEERING, AIN SHAMS UNIVERSITY
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FACULTY OF ENGINEERING, AIN SHAMS UNIVERSITY
CAIRO, EGYPT

Date: / /

بسم الله الرحمن الرحيم

وَقُل رَّبِّ زِدْنِي عِلْمًا

صدق الله العظيم

To my Mom, Dad, my husband and sister

for all your Support

and Unconditional love

I. Statement

This thesis is submitted to Ain Shams University for " the degree of master of science in architecture ".
The work included in this thesis was accomplished by the author at the department of architecture, faculty of engineering, Ain shams university, during the period from 2015 until 2018.
No part of this thesis has been submitted for a degree or a qualification at any other university or institute.

Name: Hoda Abd Elmonem Abd Allah oraby
Date:
Signature:

II. Introducing the researcher

- Name: Hoda Abd Elmonem Abd Allah oraby
- Date of birth: 23-01-1989
- First degree: B.Sc. in Architecture, Faculty of engineering, Thebes academy
- June 2010.
- Accumulated grade: V. Good with Honor

Hoda Abd el-monem oraby

III. Acknowledgments

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My father, my mother, my husband and my sister ***Dr. Marwa oraby*** *I can't thank enough for their support encouragement and advice. It is also a real pleasure to thank those who made this thesis possible,* ***Dr. hoda Mahrous*** *,* ***Dr said Hassanien****,* ***Dr. Mohmed AboEliz*** *everybody that have helped, guided, supported and encouraged me through this research. I am heartily thankful to all the architects, engineers, writers and searchers who have benefited me by their experiences and knowledge through their books, articles, researches and internet websites.*

IV. Abstract

The research aims to comparative analytical study of different bio-mimetic approaches to reduce the energy consumed in an office building because Energy efficiency is a low cost way to save money, support job growth, reduce pollution, and improve the competitiveness of businesses., and stores consume a lot of energy—and money.

Bio-mimicry *(from bios, meaning life, and mimesis, meaning to imitate)* is the study of natural forms, systems and processes in nature in order to find more effective and sustainable ways to design and engineer products, buildings and service systems[1]. The way how natural systems operate can be applied to architecture to lessen its environmental impact and to increase its efficiency

Assuming that the bio-mimetic approach is one of the solutions used to solve energy problems in an office building because the correlation between biology and architecture has aligned and the two are increasingly become more intertwined. In light of increasing carbon emissions and the rise of the green building sector, architects are becoming increasingly more innovative in their design schemes. They have found that through a combination of integrated natural and built environments, a number of positive results, including reduced environmental damage, pleasing and innovative aesthetics and the low costs associated with building sustainably, can be achieved.

These attempts to investigate a new strategy for sustainable design which are derived from the evolutionary development of living systems, from their material properties and from their adaptive response to changes in their environment is achieved through an attempt of merging; bio-mimicry and architecture, exploring their potential in developing a more sustainable bio-mimetic architecture.

This thesis discusses the bio-mimetic inspiration ability to convert the ordinary architectural structures to bio-inspired structures that integrates the structure and material to produce final efficient form. Informs adaptable building skin system for natural ventilation and day lighting in an office building

V. Key words

Bio-mimicry –thermal comfort– office building – energy efficiency- building skin system

[1]Janine M. Benyus, Bio-mimicry; Innovation Inspired by Nature, Harper Collins, 1997

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