

Subject: **Smart Structure of nature and its Morphology**

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18-11-08

Morphology of building according to nature behavior: Human Nature

There are many concepts of making a building today. But most of them are the result of a struggle between the concept and real thing which is constructed as an output. If we look around in nature there are too many kinds of natural building and structures which solve their static problem intelligently by paying attention simply to utility, physical and ecological elements, etc.

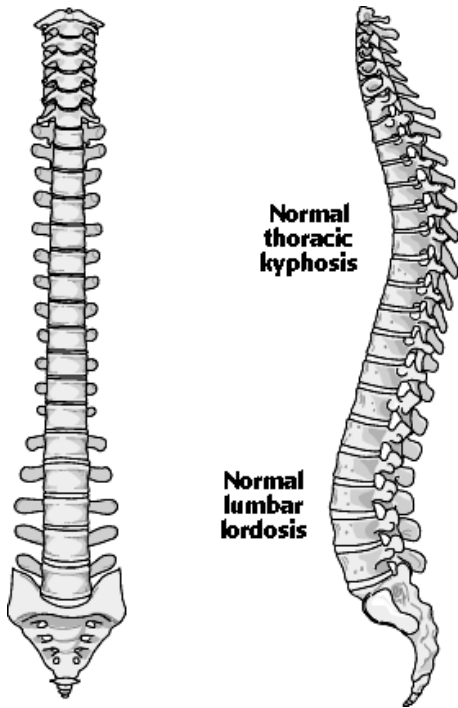
In this case I am looking at a very familiar/known smart structure and construction which exists around us, which is our body and the structure of it. Our bones and **skeletons** particularly and even morphology of some part of the molecular pieces like the nerve cell and the DNA cell in general are among the examples which I tend to note. Although human body and its structure has been known as an movable component, and buildings and constructions are often important for their stable structure, it would be crucial if we pay attention to following reasons to discuss this case:

1- Sustainability is one of the great advantages of a construction but in fact it has a lot of insensible moving in it which is not necessarily damaging the structure and is in fact inevitable.

2-Not all the natural structure and its moves are sensible.

one of the most important system in this research would be spine structure and its role to control and contact to the other relevant members in constancy of structure(skeletons) and preventing of any eventual happening in stable situation. The other issue could be variation of system as a joint system in this structure. From bone to bone till nerve to nerve in this system.

Case of studding:



Referring to main structural system of human skeleton means, spine structure and consider more about :

It's surface

Sectional surface

Relation between it and another part

And its function in relate of movement and stability.

In this reference there is a constructed project that the design of the building was inspired by a sculpture of a turning human torso. Compression of spine behavior to holding the body in unsymmetrical axe:



Turning Torso, By: Santiago Calatrava  
2005 Malmo of Sweden

Being inspired of nature helps obviously to find a system of components which have series of relation to each other and that make the system smart.

In this case, digital tools can help the research and design to find the hidden problem's parameters and help designers to find the connection between the members in the digital area,

particularly in stimulated 3 dimensional arenas. For example GC program can make some opportunity to made some stimulation to compare and find strategy to make some step for typical structure. It means that it could bring some methodology for consider new structure according to this process.(Like something that Lars Spuybroek has done as 5 speed methodology developing)

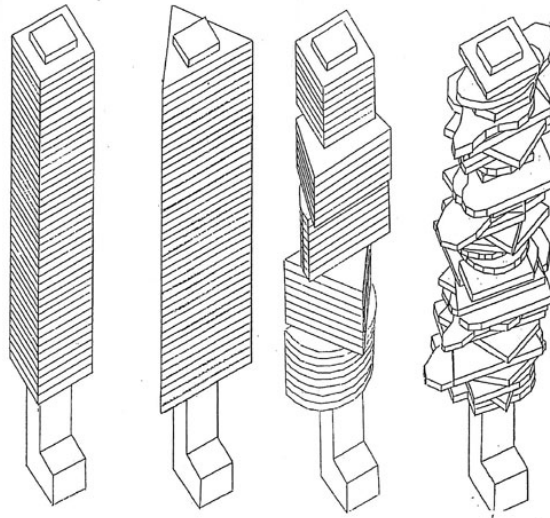
This research would be focused on one part of the examined subject. My sequences of research are outlined below:

Motivation: Inspiration of nature to make stable situation in face of inclination of every little bit to be irregular.

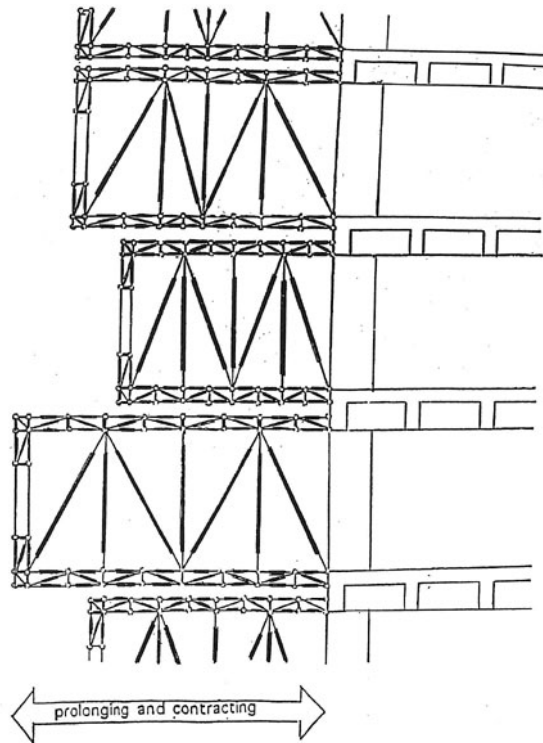
Problem: This inspiration can give the environment which is composed of comparison human made constructions (structure) and natural structures to reach an innovational solution.

Approach: Collected information from the nature and putting them in digital area to find the clear notion of sustainable and creative design. considering more in several type of structure depend on our case.( More about behavior of spine structure and cantilever system.)

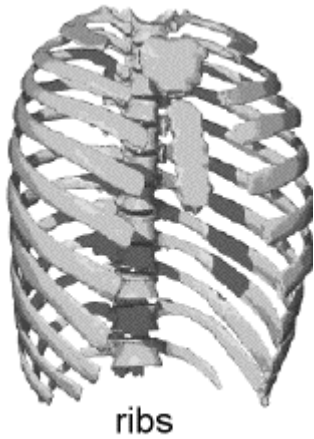
The image bellow shows 4 different views of the same skyscraper, from the simplest to the most complex shape, that combines squares, triangular, polygenic and round shapes. All the floors are identical in the first rendition, and each floor is different in the last one.



Each floor is independent from the other ones, making it possible to expand or contract, at will, each one of them, creating the ideal livable space for each occupant of the building, either families or companies and corporations. The picture below illustrates the general principle.



One of the most important system in this respect is cantilever in structure.



ribs

Cantilevered system, relate to spine structure

**Result:** prepare of stimulate area with minimum probability of transient for designed construction.