

Chapter 7

THE MECHANICAL SUPERIORITY OF THE BONE

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INTRODUCTION

Nature has used strong structures to erect the body. Biologists and researchers have sought to understand the loadbearing designs occurring in animal and plant structures for centuries. From their findings and perspective designers and engineers seek to generate designs for new problems. Recently, researchers are adapting what they have learned from animal bones for use in architecture with a wide range of materials. The aim of this study is to consider the natural processes as a starting point of structural modeling, gain insights and then improve the performance of the system which is inspired by how the bone endures to high stresses while having a slender form and being light weight. The differences between the sections of filled and porous structure components are also demonstrated, the advantageous aspects of porous structure and hydraulic effects of liquid filled porous structures according to architecture and engineering are specified at the end of the study. Bones resist as natural structures to several forces acting due to the solidarity between ductile and brittle contents present in them.

A structure is an assemblage of materials which is intended to sustain loads. Every plant, animal and all the works of man have to bear mechanical forces. Biological structures came into being long before artificial ones. Primitive kind of life had soft tissues in prehistoric ages. As living creatures multiplied, life became more competitive, and the weak could not survive. The use of rigid tissues exploited skeletons; however, the weak point of the bone was being brittle. Hence soft parts were frequently used in functional ways to limit the loads upon the skeleton and protect it from the failure of brittleness. Flexibility and slenderness have been climax importance for the living creature's structures so as not to deceive the stability and bear the loads. To imitate

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