



Learning from the nature: Bionics & Lightweight design

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Abstract

Actually, the most important problems in the world are the management and store of resources, energy and information. The facility design for the smart cities in the future has a new challenge to achieve optimized models. Thought the lightweight design bionic inspired is one of the wide range of options to research new models, developing new products and innovating with sustainability materials. The task has a high social impact to perform in cost reductions and user experience, so as the co-working to achieve the solution with the application for the construction of a low cost "Bioexoskeleton". This lightweight structure is autonomous robotized with an easy recyclability of the materials like the bamboo and the spider net. The integration of the systems will be an asset to support the treatment of the paralysis disease of Duchenne. This disease affect to everyone. This type of arthrosis causes the loosing of the body mobility increasing perceptually. The solution to this disease will be provided for the robotic design of the exoskeleton optimized with biomechanics design and concepts of the bionic and biomimetic.

The concept phase of the process design needs the inverse engineering of the lightweight structures based on insects or arthropods performing with the FEM and the research for the characterization of the biomaterials for the modelling and construction. That will be also a low cost product that permit the evaluation and validation of the method applied. In this way is associated a multidisciplinary knowledge and co-work with the Industry and the Academy. The possibility to expand the analogy of the solution for problems of others research fields or complement the current research lines is open. This is a part of the evolution for the future in a cybernetic culture.