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Mechanical response of 3D printed composite materials

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Now-a-days in order to overcome the limitations of the physical abilities, humans have tried their best to find external ways and use the object or power to enhance their strength of physical endurance. Therefore, some auxiliary devices can be able to bear structures and power systems similar to exoskeletons have emerged that provide additional energy to enhance the power of the body. The common exoskeleton devices developed in the market are worn on the human body and it has the problem of the weight of the auxiliary device. Therefore, the design of the structure, especially porous structure is important since it is the efficient way for achieving the lightweight purpose. The porous structure is a three-dimensional structure formed by a large number of pores of the same shape. To compare with general continuous materials the porous structure has the advantages of low relative density, high specific strength, good permeability, etc. In this research, all of the samples were fabricated by fused deposition modeling (FDM) method. The materials used in this study are composite which combine nylon and carbon short fiber. The advantages of these composite materials are excellent tensile strength, corrosion resistance and fatigue resistance. However, the difference in scanning strategies during the manufacturing process would directly affect the mechanical properties of the structure. Hence, the relationship between the porosity structure design, scanning strategies and the mechanical properties will be explored and discussed in detail. Besides the differences between the loading directions of the porous structure are also the emphases in this research.

Biography

K U Huang was a MS student in the Department of Bioinformatics and Medical Engineering, Asia University, Taiwan. His research interests include mechanical response of 3D printed composite materials.

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