

Poster Session (P)

Poster Lunch (1)

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LIGHT AND HIGH BENDING STIFFNESS SUPER THIN BIONIC STRUCTURE AND ITS SPACE APPLICATION PROSPECT

Abstract

Structure with small density but high stiffness has much more excellent mechanical properties than homogeneous structure for aerospace products. It can reduce the produce mass, saves the cost of emission, and reduce the moment of the inertia. Usually, the acquiring of satisfactory mechanical structure depends on the engineer's experience or the mechanics experiment results, and it is usually after times of modifying and optimizing. In the natural, exquisite structure of some plants has excellent mechanical property, because the structure forms in specific mechanical environment, it withstood the test of time and environment. This provides the thought of weight reduction design for aerospace products. This study works for the phenomenon of wind resistance of the super thin Typha stem. The authors adopt the method of slicing and mechanical loading to study the structure characteristics and bending stiffness at different position on each direction of the testing stem. The reason of its high bending stiffness is analyzed. Based on the analysis result, this study proposed the bionic Typha structure. The finite element simulation shows that the bionic structure has lower weight and much more excellent bending stiffness. This study has certain reference value for the weight reduction design of aerospace products.