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SPIDER-SILK COMPOSITE MATERIAL FOR AEROSPACE APPLICATION

Abstract

Composite materials are very attractive options for aerospace and aeronautical industries particularly because of their high strength to stiffness ratio. The main design requirements for any space craft or aircraft is the strength to weight ratio. The composite material become significant mainly because these materials can be designed based on the material required properties. Today we find a huge variety of composite materials like Fiber Reinforced Composites, Particle Reinforced Composites, Sandwich Panels, Metal Matrix Composites, and Ceramics Matrix Composites differing substantially in build-up, matrix and reinforcement type, Fiber reinforced composites are very common in space industry applications. Composites are non-magnetic making them a desired material for aircraft applications. This paper is further extension of Ref. [7] to calculate the weight reduction of a single window pane. Spider silk has properties which make it stiffer than Kevlar and steel. This material could drastically reduce the amount of material used in various engineering fields like civil, mechanical etc. In this paper we analyze a structural model of an aircraft window pane and the results are compared against the standard material currently used in industry. The excellent elastic properties of spider silk material making it an ideal fiber material for composites. The composite material has spider silk fibers as reinforced material and epoxy as matrix material. Reduced weight calculations without compromising the performance of the structure has been carried out in this research paper.