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APPLICATION OF COMPOSITE SANDWICH STRUCTURE WITH LATTICE CORES IN AIRCRAFT LIGHTENING DESIGN

Abstract

This paper is concerned with application of composite sandwich structure with lattice cores in aircraft lightening design. Lightening design of aircraft is pursued all the time in order to reduce the cost of space transportation. In the conventional design, the inside structure of aircraft is mostly metallic, and the outside structure is non-metallic thermal protection system. The effect of reducing weight by ordinary structure optimization is limited. The lattice structure which has small density, high specific stiffness and high specific strength and is more likely to integrate multi–function has attracted more and more attention in recent years. A lot of research on lattice structure with different materials and configurations has been made by many institutes. This paper has used strake wing, a common component of aerospace vehicle, to study and test the composite lattice structure concept, and proved that composite lattice structure can be applied in structure design of aircraft by making theoretical calculation and strength test of scaling test sample. Application of composite sandwich structure with lattice cores in aircraft can not only lighten the structure of aircraft, but also effectively reduce the mass of thermal protection system due to the thermal resistance property of composite. Useful exploration has been made during the research on composite sandwich structure design with lattice cores and lattice structure realization process, and desirable result is obtained.