STATIC BEHAVIOUR OF AN ADVANCED ULTRA-LIGHT SANDWICH COMPOSITE STRUCTURE FOR A WHEEL CHAIR

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Abstract: A theoretical approach of an ultra lightweight sandwich composite structure with extreme rigidity is presented. The structure features two carbon/epoxy skins reinforced with twill weave fabric, and an expanded polystyrene (EPS) core. The structure is subjected to a biaxial field of normal loads combined with a shear load. An equivalent model of this structure is presented. It has been accomplished a comparison between this structure and a similar one with glass/epoxy skins reinforced with EWR-300 fabric. Sandwich structure's strains, stresses, skins plies' strains and a comparison between the rigidities of the structure's components are presented. A theoretical approach regarding the bending of the structure is also shown.
Key words: sandwich, structure, expanded polystyrene, core, carbon/epoxy skins, twill weave fabric.