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FEM ANALYSIS OF AIRPLANE WING USING COMPOSITE AND NATURAL FIBER MATERIALS

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ABSTRACT

The primary goal of this research is to analyse of fly wings of Airplane with different material such as EGR Glass, R Glass and S Glass with the help of Finite Element Analysis (FEA) and superior replacement materials for the existing material that is used in aeroplane wings in order to reduce the amount supply energy. This research is being conducted in order to fulfil this objective. This is the fundamental aim of the investigation that is being proposed. As a direct result of this, the present inquiry tackled the design process by using simulation tools such as Catia and Ansys workbench 20. This was done in order to get a better understanding of the system. The aviation industry is placing a significant amount of emphasis on weight reduction measures, which may be achieved by implementing innovative designs, more efficient manufacturing processes, or the use of alternative materials. It has been found out that the kind of materials that are most suitable for aeroplanes are ones that are able to withstand high pressure yet are relatively light in weight overall. Static structural analysis was done for the Aerofoil wing structure and performance was measured using different materials. The finding reveals the best material for maximum deformation under the pressure of 0. 005MPa was S Glass which gives 0. 049 mm deformation. S Glass may one of the best alternative materials among all others as it has better performance on deformation and this can help to minimize the deformation under high pressure as well. All three materials selected for this analysis performed identically for this particular condition, and it could be different for different working conditions. S Glass performs overall well as it gives a maximum von- Mises stress 0. 049MPa and maximum deformation of only 0. 049 mm.

Keywords: FEM, Aero foil structure, Wing, Distortion, Optimum condition, Composite and Natural Fiber.

INTRODUCTION

The most advanced wing design has a sizable wing box that not only gives the shape the force and power it needs to withstand the high aerodynamic loads, but also stores the majority of the fuel that is transported through the aircraft. As a result, the most sophisticated layout for an a wing is adopted. This layout is thought to be at the forefront of modern design techniques. Many people may get headaches if this stiff form were to be replaced with a more pliable one, and it might be necessary to set up a different method of storing the fuel in the event that this shape became more malleable. Yet, it is possible to get a better laminar glide without abandoning the conventional wing box concept if morphing structures are used to replace the adjustable high raise devices most effectively. This objective will be achieved by