

Cork Composites for Sustainable and Eco-friendly Applications in Aerospace Sector

Educational Perspective for Cork Composites in Aerospace Applications

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Abstract— In recent applications, composites have been developed by including natural products such as cork. Cork is a suberous casing of the species *Quercus Suber* tree, also known as cork oak. Mediterranean coasts of Europe, especially Portugal and Spain, include the major territories of cork oak and 90% of cork products are produced from there in the world. Cork forests protect the environment from desertification while providing suitable habitat for several animal and plant species. This lightweight material exhibits elastic and thermal/vibration isolation properties while retaining imperishable behavior. In current applications, cork is used as an insulation material in engineering. Although cork products have been already utilized in different applications, the usage rate of cork is very low in major industries such as aerospace. However, the European Union (EU) policies and reports from different organizations all around the world call attention to environmental problems and thus, eco-friendly and sustainable materials gain importance for future applications. Leading organizations have investigated advanced composites from natural products. For this reason, cork is a candidate natural material for engineering applications due to its excellent properties as well as imperishable behavior.

Aerospace is a leading sector for the usage of sustainable and eco-friendly natural materials such as cork. The main reason for the selection of aerospace industry as the implementation sector is that this industry is familiar to cork composites as using them in aircraft, helicopters and space shuttles. Moreover, aerospace industry is the leading sector for the development of natural composites since huge amounts of investments are made by the companies and governments. Scientific developments mostly emerge in aerospace industry then spread to the other sectors.

This study aims to develop educational materials for gaining environmental awareness of eco-friendly composites as well as understanding the importance of cork in sustainability. Within this scope, partners in a EU funded project, namely ECOCORK, have developed an educational scheme, and the partnership has been

concentrated on individuals at the college level. After developing a curriculum, the partners have produced a textbook about cork in aerospace applications. In addition, lesson presentations and videos have been prepared for supporting students in learning about cork composites. For self-assessment of the students, a set of quizzes has been produced. Moreover, staff skills have been enhanced in a particular and promising field with the interactions between pacemaker partners. An industrial partner has contributed to the preparation of training programs on sustainability and carbon footprint of cork products since it is a leading cork producer globally.

Keywords— sustainability; cork; aerospace applications.

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