

Redesign of a Furniture Industry Component: A Sustainable Design Approach

Boppana V. Chowdary^{a,Ψ}, Marc-Anthony Richards^b and Trishel Gokool^c

Department of Mechanical and Manufacturing Engineering, Faculty of Engineering, The University of the West Indies,
St. Augustine, Trinidad and Tobago, West Indies;

^aE-mail: boppana.chowdary@sta.uwi.edu;

^bE-mail: marich8@gmail.com;

^cE-mail: trishelgokool@yahoo.com

^Ψ Corresponding Author

(Received 05 October 2018; Revised 07 January 2019; Accepted 18 January 2019)

Abstract: Sustainability has been a recent trend in the manufacturing industry, owing to environmental concerns. Product designers are now looking at effective approaches for sustainable product design. Design for X (DFX) tools and techniques have widely been used over the years to streamline the design and manufacture processes. Design for environment (DFE) is becoming of critical use in the preliminary phases of the product design process in order to render cost-effective and environmentally friendly products. This can be enhanced by deploying computer-aided design and engineering (CAD/CAE) tools which have the ability to manipulate the product concepts in a virtual environment. The efficacy of this approach is demonstrated through a case study involving the redesign of a component selected from the local Caribbean market. The SolidWorks package was used to generate CAD models which were further analysed by using the Simulation and Sustainability modules. The guidelines of Design for Manufacture and Assembly (DFMA) and DFE were also utilised in the redesign. The research shows that DFX tools and techniques, namely CAD/CAE and DFE, can be combined in a single platform to effectively redesign products to meet functional and environmental requirements.

Keywords: DFX tools, product redesign, product sustainability, case study