

## **Life cycle analysis of hybrid oil palm/glass fibre reinforced polyurethane composites for automotive crash box**

### **ABSTRACT**

Currently, the world is getting more poisonous due to the toxic contaminated and wastewater release from the industries activities. The designers should analyse the effect to the environmental and human health, prior starting any manufacturing and fabricating process. This technique able to optimize the company profit and reduced unnecessary cost by predict any consequences and do correction step before the problem emerge for every action taken. Therefore, this paper aim to provide the evidence that the selection of material and manufacturing process used to fabricate ACB has minimum impact on the environment and human health. A few methods can be used to calculate the environmental damage assessment such as network, compare and uncertainty analysis. In this study, analyse calculation method selected to predict the environmental impact. The results for the damage to human health analysis only contribute 0.0125 DALY, analysis results for the hazardous elements such as methane, trichlorofluoromethane and Chlorofluorocarbons produced during the fabrication process only  $1.32 \times 10^{-9}$  DALY. Besides, the major damage elements to ecosystem quality results only contribute  $1.97 \times 10^{-4}$  species.yr. Therefore, the remarkable results show that the process and material selection to fabricate ACB are very low which was below than 0.1 DALY. Moreover, damage assessment for the terrestrial ecotoxicity of pulforming process using oil palm natural/glass fibre reinforced polyurethane composite only contributed  $1.13 \times 10^{-10}$  (species.year). Consequently, the process could not damage the human health and indicates that the process is environmentally friendly and safe for the ecosystem.

**Keyword:** Life cycle analysis; Automotive crash box; Natural fibre composite; Sustainability analysis