

ECODESIGN Toolbox for the Development of Green Product Concepts – Case study injection moulding machine

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1. Introduction

This paper describes the results of a project carried out at the Institute for Engineering Design of the Vienna University of Technology. The project aimed at developing a systematic approach for sustainable product design and is called “ECODESIGN Toolbox for Green Product Concepts”. With application of the systematic approach innovative product concepts have been developed during this project in cooperation with partners from industry. The method has been implemented in three case studies: a digital voice recorder, a golf swing analyzer and an injection moulding machine (Figure 1).

In this paper the procedure and the results of the case study “injection moulding machine” in form of a Green Product Concept will be introduced. This project was funded by the Federal Ministry of Transport, Innovation and Technology and the Austrian Research Promotion Agency (Project number: 810777).



Figure 1: Injection moulding machine

Research questions answered in the project:

1. How to environmentally describe a product as complete and easy as possible? Which technical parameters (e.g. weight or used energy) have to be considered?
2. How to quantify and assess environmental impacts of a product in a practical way?
3. How to consider stakeholder requirements (e.g. from environmental legislation) systematically?
4. How to record, analyse and assess production processes and how to derive improvements out of this analysis?
5. How to derive improvement strategies from process, product and stakeholder requirements?
6. How to assess process, product and stakeholder improvement ideas and how to combine them to a Green Product Concept?

2. Description of the method

The ECODESIGN Toolbox combines three different approaches, namely environmental requirements from product and process view and stakeholder requirements, to achieve a Green Product Concept. A Green Product Concept is obtained by six steps pointed out on Figure 2:

In the first step system boundaries for the products to be analyzed have been defined and a schedule for the systematic description of the product by using environmental parameters has been worked out.

In the second step the product was assessed to identify the life cycle phase which contributes most to the environmental impact. For this purpose the ECODESIGN Assistant [1] was applied which enables the application of Life Cycle Thinking. By using the data gained from the product description step the ECODESIGN Assistant suggests ECODESIGN improvement strategies for the product.