Abstract:

This study presents the experience with the use of a simplified LCA tool in the early phase of a product development process. It concludes that although a simplified LCA can be used to gather important knowledge, sharing it both with the team and the customer is crucial in order to effectively integrate this knowledge in the product development process.

Introduction

It is commonly accepted that Life Cycle Assessment is a successful tool in order to evaluate environmental performance of products yet the use of LCA in product development (PD) is not a straightforward procedure. The use of simplified LCA in a design phase of a product development process can be an effective tool to enhance eco effectively, given the condition that the goal and scope of the LCA study are selected in conformity with a specific need and implemented in a conscious and reflective manner.[1] But, without knowledge about why and how environmental concerns should be integrated into a product, other requirements will be perceived as more important and take precedence.

It is stated that the tools in Eco Design are not as important as specification and goal setting early in the development phase. [2] But without knowledge on environmental performance of the product it becomes difficult to aim at environmentally beneficial solutions. The design paradox as shown in figure 1 indicates the need for knowledge in early PD phases. The possibility of improving the eco efficiency of a product rapidly declines as the PD process progress. The purpose of an LCA is to enable the user to make a judgment on environmental performance.[1] The use of a simplified LCA as a tool to identify environmental hotspots by analyzing product concepts and similar existing solutions will give more knowledge early in the PD process when there is a high degree of freedom and possibility of affecting the eco efficiency of the end product.

![Figure The design paradox in relation to eco efficiency (Inspierd by M. Lindahl)]
Case study: Simplified LCA as a design tool for developing fish processing machinery

The simplified LCA study as a tool to identify environmental hotspots was used in the early phase of a PD process of new fish processing machinery. The study was conducted by one member of the design team who had previous experience with LCA and a background in mechanical engineering. The inventory analysis was based upon similar existing machinery with the same function as the intended new product being developed. The work was done in parallel with the PD process, and the results were communicated back to the team. There were no external driver for the use of design for environment methods or tools, and no formal requirements of environmental performance that the new machinery had to comply with apart from the CE approval.

Findings

In this case study, the need to understand contextual aspects in order to develop and implement useful design tools based upon LCA methodology became clear. Although the use of a simplified LCA showed promising results, the lack of external drivers for eco design made it harder to justify the use of resources within this area in the PD process. The case study concludes that environmental agitators and trained designers need to be the drivers of design for environment methodology and LCA based design tools, by proving and communicating the benefits from using such tools in practice. To avoid this becoming an uphill battle, environmental agitators in a design group need to be both legitimate and credible. The empowerment and integration of environmental agitators in a design group need to be done seamlessly with the knowledge and information shared throughout the whole product development process to gain the most benefit from the utilized methods and tools, to ensure system thinking and avoid end of pipe solutions.

References