GREEN TIPS FOR CONCEPTUAL DESIGN

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Abstract:The paper deals with the elements of environmentally friendly design. It analysis how the most popular techniques are operating and gives a suggestion for implementing introduced techniques. According to the analysis it proposes a principle-collection that is called Green Tips and is suitable for adapting to a software that helps designers during conceptual design process.

Keywords: design theory, methodology, Design for Environment

1. INTRODUCTION

It is not easy to shortly define environmentally friendly design. According to the several components it has, it is quite a complex process. According to Zilahy [1] environmentally friendly design systematically concentrates to the environmentally impacts that are potentially coming in the fore during the whole life-cycle of products and services, and to reduce or eliminate these expectable impacts still in the design process.

Orbán [2] defines DFE as a design, that minimalizes the undesired impacts for the nature (DFE=design for environment). DFE is the necessity of the developed product causes the less harmful impact on the environment that is an ever-growing claim of today.



Figure 1 Machine-human-environment cycle

1. TOOLS OF DFE
	1. 3R, 4R, 6R

3R philosophy means nothing else but not accumulating used or consumed materials as waste, but recycling them to the product-market. Reduce means to lower the quantity of the waste, reuse means using again the waste, recycling means using waste for creating new raw material. This cycle is shown in Figure 3. There are several versions for 4R. Usually recover, rethink and replace are mentioned as the 4th R. Elements of 6R are introduced in Figure 4 by a pyramid.

Figure 3 3R method

1. Green Tips

Previously collected environmentally friendly tools are suggesting very general possibilities for designers. It would be really hard to get them one-in-one in the conceptual design phase, this very early phase of the whole design process. So on the basis of the introduced principles a system should be carried out that are can be adapted even in this early phase of design and effectively assist the designers’ work. In this phase designers still do not know sizes, materials, maybe certain connections can be determined, but no constructional features are available, because this task is realised in a later phase of the design. Expectable green effects can also be evaluated later. But certain principles can be taken into consideration.

Table 1

Tip matrix

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | HT1 | HT2 | HT3 | … | HTn |
| GT1 |  |  |  |  |  |
| GT2 |  |  |  |  |  |
| GT3 |  |  |  |  |  |
| … |  |  |  |  |  |
| GTn |  |  |  |  |  |

|  |  |
| --- | --- |
| $$\begin{matrix}GT\_{i}&&GT\_{z}\\\downright &&\downright \\F\_{1}&-&F\_{n}\end{matrix}\begin{matrix}\\\\;\end{matrix}\begin{matrix}GT\_{k}&&GT\_{f}\\\downright &&\downright \\F\_{i}&-&F\_{j}\end{matrix}\begin{matrix}\\\\\cdots \end{matrix}$$$$\begin{matrix}\uparrow &&\uparrow \\HT\_{j}&-&HT\_{p}\end{matrix}\begin{matrix}\\\end{matrix}\begin{matrix}\uparrow &&\uparrow \\HT\_{v}&-&HT\_{q}\end{matrix}\begin{matrix}\\\end{matrix}$$ | (1) |

1. Summary

On the basis of the above introduced principles defining a list is in process that takes not only environmentally friendly design but ergonomics as well into consideration. And on this basis gives suggestions to the designer during the conceptual design phase while making the list of functional subassemblies by suggesting ones from the built-in ones. Further task is to develop the subassembly-kit and the tip-list.

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