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# A PRACTICAL METHOD FOR DFE AT VOLVO PENTA

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## ABSTRACT

When designing a new product, or generation of new products, a lot of decisions are taken regarding choice of materials, energy consumption, pollution from production processes etc. For complex products like engines it is not always obvious from a designer point of view what the best choice from an environmental perspective is. At Volvo Penta a method is used that is based on experiences from Life Cycle Assessments but transformed into a practical methodology.

## INTRODUCTION

Volvo Penta produces diesel engines for marine and industrial applications. Environmental care is together with Safety and Quality core values of the Volvo Group.

Volvo has been working very actively in the initial development of LCA methodologies and evaluation methods. Contacts and exchange of competence (Baumann, 1995) with Swedish and international researchers and institutions are frequent. Studies are made both on complete vehicles as well as on different vehicle components. Different LCA methods and assessment models have been used (Steen, 1999 and Finnveden, 2009). These studies have resulted in a lot of new knowledge about where in the life cycle different types of impact occur, relative magnitudes and most important factors to consider in Volvo products and operations. To make the knowledge practically available, a method has been developed for use in the design work.

## MATERIALS AND METHODOLOGY

Larger Volvo Penta development projects follow a project model that contains 9 different stages; Pre-study, Concept study, Detailed development, Final development, Industrialisation and Follow up.

During the Concept study a mandatory preliminary environmental assessment is required to be carried out. The assessment is carried out as a team discussion following a standard procedure including a template where all the different life cycle phases are regarded. The technical project leader describes the proposed design and function, project targets relevant for environmental impact as well as production site and suppliers chosen.

Examples of environmental aspects relevant for a diesel engine are: fuel consumption, emissions of PM, NOx and CO2, interval for oil change, surface treatment, engine packaging

size and material, possibility for material recycling, degree of recycled material used etc. Environmental aspects are raised and issues of concern are either put on an action list or decisions are taken directly where possible.

For each component or aspect a check against possible environmental impact, company steering documents and public concern is done. A template is used to guide the discussions and document upcoming issues and decisions.

The composition and skills of the team is of course crucial for the result. An environmental expert is a mandatory participant of the team, ensuring continuous access to updated environmental facts, legislation, new LCA studies etc. Other participants may represent design, purchasing and manufacturing depending on the type of project.

At a later stage in the Final development phase the preliminary assessment is reviewed and actions followed up.

## RESULTS

By using the described method, the product under development is evaluated regarding life cycle environmental aspects. Issues and concerns, as well as decisions taken, are documented in the formatted template and added to the rest of the project documentation.

## DISCUSSION

By using this procedure for identification and evaluation of potential environmental aspects during the life cycle of a product, better choices of material, assembly methods, surface treatment, transport modes etc can be made. Solutions with higher environmental impact can be avoided and improvement possibilities identified.

Another result from the team discussions and cooperation in evaluating environmental aspects is the continuous training of designers and project leaders in environmental matters. A work has started to further improve the process and tool with adaptation to new circumstances and knowledge.

## CONCLUSIONS

Environmental care is a Volvo Penta core value and it is important that considerations are made during product development to constantly reduce the environmental impact through the life cycle. We consider that the method for environmental assessment we use serves as a good tool for that.

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