ECO-CONCEPTION, RECYCLING AND LIFE CYCLE ANALYSIS IN THE CABLE INDUSTRY

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ABSTRACT

In this article we present a three-folds approach of the environmental characteristics of cables products:

At the design step, product developers use the EIME software to compare the environmental impact of various options.

During the development phase, an in-depth research is performed to provide environment friendly, non-polluting, and easily recyclable materials as well as processes consuming less energy and raw materials.

Finally, we conduct research to facilitate product recycling when cables have reached the end of their useful lives, and recycle using our dedicated facility.

KEYWORDS

Eco-Design, EIME, Cable, Recycling.

INTRODUCTION

An environmentally conscious leading cable manufacturer, developing and producing a wide range of cables, has to constantly aim at reducing the global impact of its products on the environment, over their entire life cycle.

To achieve this goal in our company, we have put in place a multi-step approach, involving Cables Design, Research & Development and Recycling.

CABLES DESIGN

Since many years we have been designing cables (1) , (2) using a reference software called EIME (Environmental Information & Management Explorer), developed by CODDE (Conception Developpement Durable Environnement) and jointly supported by famous E&E (Electronic & Electrical) industrial companies. More detail is available on http//www.codde.fr.

This user friendly tool is particularly well suited to compare various alternatives at the design step of cables. It is also useful to calculate the impact when the product is used or transported as well as when the product has reached its end of life and is recycled. These two additional considerations are not taken into account in this presentation.

The principle of the modelling with EIME lays into decomposing the product in sub-assemblies, that are then parted into simple materials and process elements, possibly linked together depending on the involved processes.

Thanks to the huge work performed by the community of users, as well as to the existing databases of well know organisms (like WTO…), databases adapted to E&E products are used to compute the impact of the product on 11 major environmental indicators, pre-defined in the software structure.

The global result is represented under the form of a radar chart that allows to easily compare results "at a glance" (Fig. 1).
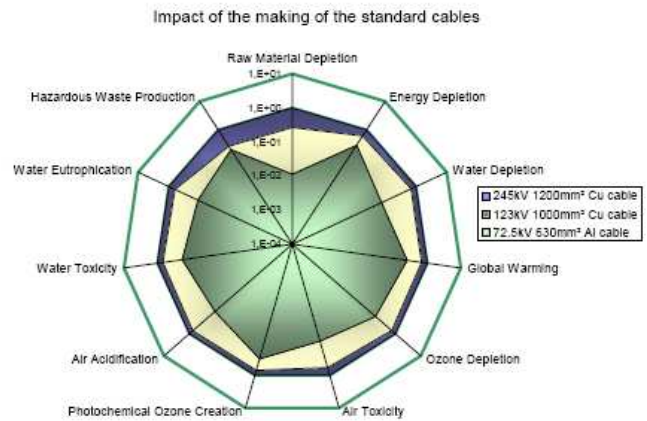
Impact of the making of the different cables
Fig.1 Typical radar chart (from ref.1)

More detailed tracking of the impacts of individual parts or subassemblies of the product is possible, on one or many of the considered indicators.

As a matter of example, we report here different cases, with increasing complexity.

Application to single core automotive wire

A $0.5mm^2$ single core wire, widely used in car harnesses manufacturing is probably one of the simplest possible case.

Fig. 2 shows the radar picture of the modelling results for both PVC and XLPE insulation layers.

The software takes PVC as a reference for comparison. The center point of the radar is the "no impact" point. The closer from the center, the less impact the product has on the environment.

One can easily see that the Hazardous Waste (HW) Production is significantly reduced by using PE based plastic, due to a much less creation of hazardous waste. The software gives in addition the lifetime step in which the HW is created. In this case it is found to be during the synthesis of PVC itself.