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Development of Product Category Rule (PCR) for an Environmental Product Declaration of Conveyor Chain Systems

L. Lüdemann, M. Bona, M. Golder
Faculty of Mechanical Engineering, 09110 Chemnitz, Germany
Fax: +49-371-53137144, e-mail: lynn.luedemann@mb.tu-chemnitz.de

Abstract

The challenge of the 21st century is to guarantee a good life for 10 billion people at our planet, within its limits. Climate and resources must to be protected. To fulfil the 2 °C goal for climate change it is necessary to rebuild our society. One part of its rebuilding is the improvement of efficiency of energy using products.[1]

The article describes an actual research topic at the Professorhip “Materials Handling, Conveying and Conveying engineering” from the research team “Plastic Components and Tribology”. The goal of the project is the development of a “Product Category Rule” (PCR) for “continuous working conveyor chains”. PCRs are a set of specific rules, requirements and guidelines for developing Type III Environmental Declaration for one product category. [2]

To develop an EPD, it is necessary to conduct a Life Cycle Assessment (LCA) of the observed product system. EPDs are intended for use by industrial consumers in commerce and industry as a source of environmental information. They are designed to provide a high standard of reliable, quantitative, comprehensive and freely accessible facts concerning the environmental impact of products and services. One of the objectives of the EPD is to compare environmental performance of different products – therefore it is necessary to establish a common method on how to assess and calculate the environmental impact. The PCR is intended to serve this unambiguous approach to enable comparability of EPDs of different products but part of the same product category. Therefore, the PCR defines the functional unit, allocation rules and cut-off criterias etc.[5 – 9]. Both, the PCR and EPD are considered to be marketing instruments coming from the push strategy of the EU for green products, that is part of the EU climate and energy package. [3], [4]

Previous research focused on the improvement of the properties of conveyor chains, for example durability and noise development. Subsequently, the next step is to show the (hopefully positive) influence of these improvements on their environmental performance.[10 – 13]

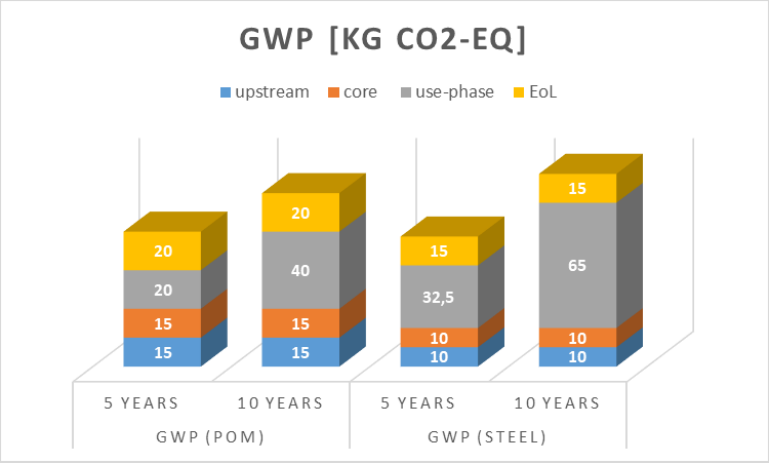

figure 1 Comparison of Global Warming Potential (GWP)

Other objectives of the research project are the determination of environmental sensitive factors in the cradle to cradle observation, accompanied by deeperknowledge about a Useful Lifetime and good End of Life (EoL) strategies of conveyor chains, especially for conveyor chains made from high-efficient plastics like POM.
In figure 1 you can see an example result for LCA calculation. It shows the results for the global warming potential (GWP) as comparison between POM and Steel (material of chain links) depending on the Useful Lifetime of 5 or 10 years.
The article will contain more detailed results of the conducted LCAs and also other impact categories such as eutrophication, acidification etc. Also results of an sensitive analysis regarding the influence of mechanical parameters (e.g. friction) or mechanical factors (e.g. load, velocity) will be shown in the arcticle. Furthermore, the article discusses marketing aspects of EPDs, in particular whether an EPD could possibly improve the market penetration, and if they are applicable also for Small-and-Medium-Enterprises (SMEs).

Keywords: Environmental Product Declaration, Product Category Rules, Life Cycle Assessment, Ressource Efficiency

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