

Environmental FMEA – a new approach to methodology

M. Roszak, A. Kania, M. Spilka, E. Jonda

Department of Engineering Materials and Biomaterials, Silesian University of Technology,
Konarskiego 18a Str., 44-100 Gliwice, Poland, ewa.jonda@polsl.pl



Introduction

Failure Mode and Effects Analysis (FMEA) is one of the most popular methods for the systematic prevention of errors. The problem of early defect detection has become so important to result in developing a method for identifying errors in the design phase of the product. The analysis can be carried out for the whole product, a single component or a structural component of the product and for the whole technological process or any operation. The need for FMEA analysis in the field of environmental aspects was noted. The Environmental FMEA method was designed, which is one of the few recognized and used in practice and didactics in the world.

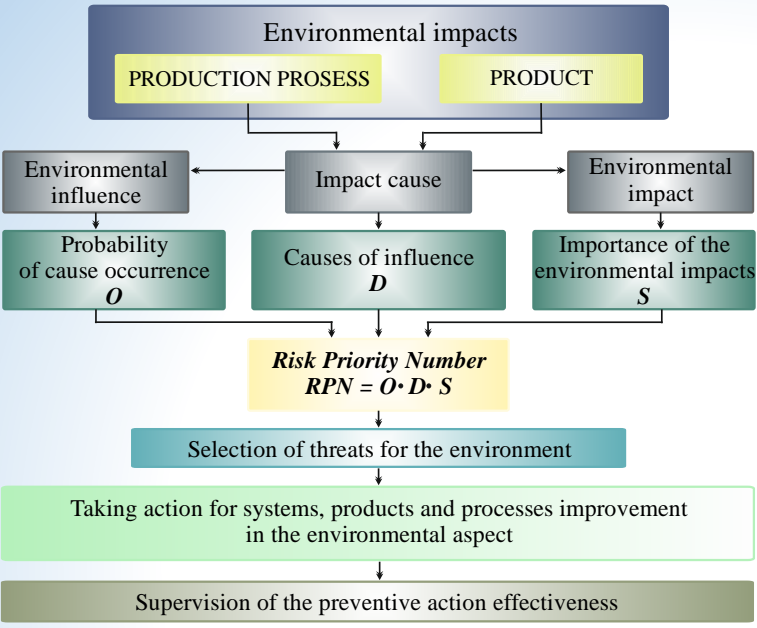


Fig. 1. E - FMEA diagram

Environmental FMEA

The E-FMEA method is a tool used in the ecodesign of the product and process. The ecodesign is a new approach to designing depending on identification of the environmental aspects connected with a product and consideration them to the designing process already on the early stage of the product development.

EEA Methodology

The environmental FMEA is known as Environmental Effect Analysis (EEA), also.

The proposed the EEA methodology is always elaborated as a simple, linear tool which consists of 5 steps: preparations, inventory, analysis, implementation, and follow-up.

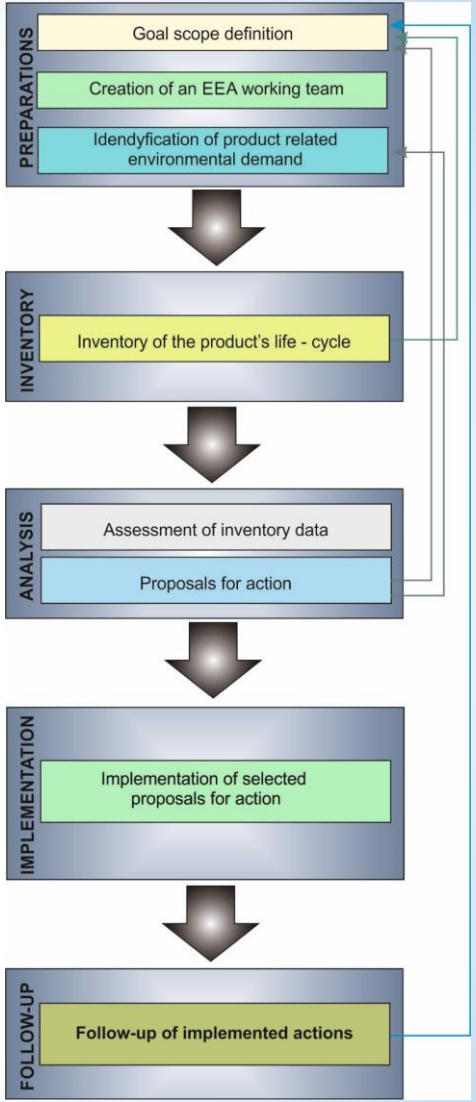


Fig. 3. Schema of the EEA procedure

Conclusions

The environmental FMEA is used for minimization of excessive environmental impact of production processes (using energy, water, raw materials, auxiliary materials and emissions) or with product use and waste elimination. The analysis helps to improve the normal functioning of processes and products manufacturing with regard to the environmental aspects.

Comparative assessments of various environmental impacts require social consensus and that is why necessary development of intrafactory regulations (standards, regulations, systems) are needed. The measure can not be just keeping regulations set limits but the idea of continuously improving the environmental impacts.

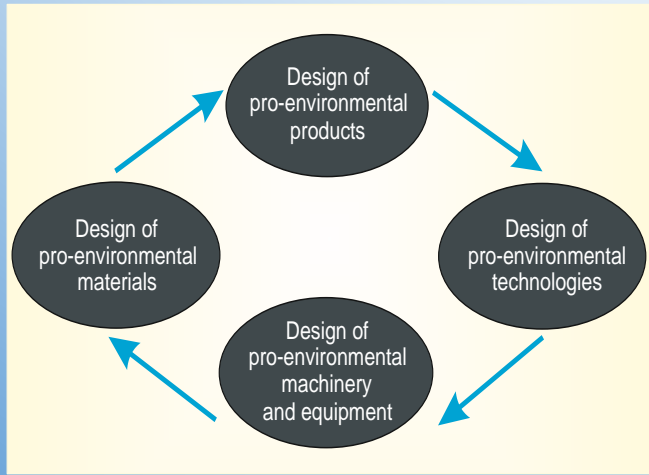


Fig. 2. Eco-design as a series of manufacturing process improvement