

The Strategic Research Centre for the Manufacturing Industry

PROGRAMME

How to design reliable & robust electronic products?

*Implementing Physics-of-Failure based Design for Reliability (PoF DfR) improvement
Lessons learned from COMPACT project*

Thursday, 28 September 2017

- 15h00** **Welcome**
- 15h30** **PoF DfR-envisioned methodology to improve the reliability process of electronics**
Steve Vandenplas, Project Manager, Flanders Make

When vehicles and machinery become more complex, intelligent and expensive and use an increasing amount of rapidly evolving electronics, traditional methods for designing electronic systems solely based on historical data and testing may no longer be adequate for manufacturing reliable products in a cost-effective way. In the COMPACT project, a PoF (Physics-Of-Failures) DfR (Design-For-Reliability) methodology has been worked out. Methodologies and tools are developed and integrated into the DfR process, which uses physical failure models to fundamentally improve product reliability and reduce development costs and time. Integration is required at component, system and overall DfR process level. The new approach will allow to make more reliable lifetime predictions in the design phase and will cost-effectively reduce wear in electronic products to the absolute minimum.

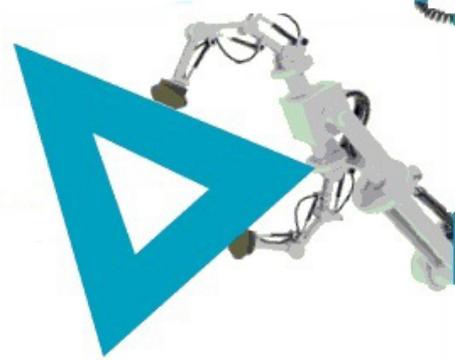
- 15h45** **PoF DfR & Qualification methodology in an electronic product development process**
Yoann Descas, Functional Safety Engineer, Flanders Make

In this presentation, we will highlight a Physics of Failure Design for a Reliability and Qualification methodology as a new approach for ensuring reliability in the development of electronic products, replacing conventional statistical and experience-based engineering processes. We will give an introduction into the COMPACT portal. This portal guides the development team through the technology qualification process and through the reliability engineering methods, tools and guidelines integrated in the overall systems development lifecycle.

- 16h05** **PoF reliability prediction and analysis at system level**
Steven Kauffmann, Research Engineer, Flanders Make

Failure and reliability analysis at system level helps to pinpoint critical product design choices. Known methods such as FMEA (Failure Mode and Effect Analysis) and reliability prediction handbooks (e.g. MIL HDBK 217) are often used by reliability engineers to assess these criticalities. However, these traditional methods often fail to consider the complexity of failures in modern electronics and / or the associated failure distributions.

This presentation will discuss updated versions of these methods taking into account Physics of Failure (PoF) and making use of correct failure distributions. A PoF-based FMEA and PoF-based reliability prediction handbook (starting from the FIDES handbook) will be presented and illustrated by case studies.



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16h25 PoF qualification: physical & virtual testing of electronic components and systems

Bart Vandeveldde, R&D Project Leader, imec

Before electronic systems can be launched on the market, they must pass qualification tests according to international standards and customer-specified test programmes. Thermal and mechanical environmental loads are major causes for electronic system failures that also appear during these qualification tests. It is obvious that any failure detected in such tests is very expensive in terms of time and cost. Performing physical & virtual testing allows to find possible weak spots in the system in an early development phase when adaptations are still easy to make. In this seminar, we will show several examples on how reliability testing and simulation are used to test the electronic components and systems from a thermal and mechanical point of view.

16h50 Industrial testimonials

Eric Verhulst, CEO, Altreonic
Jeroen Van den Keybus, CTO, Triphase

We will present the lessons learned from two industrial use cases within the scope of the COMPACT project. More specifically, we will show how POF reliability prediction and analysis at system level is applied by Altreonic for developing the KURT e-mobility vehicle. The presentation from Triphase will focus on the PoF qualification methodology and physical testing of Capacitors for their DC-DC convertor.

17h20 Q&A session

17h30 Network drink