RELIABILITY for ELECTRONIC DESIGNERS

"I believe that the concept of failure is central to understanding engineering, for engineering design has as its first and foremost objective the obviation of failure."

Professor Henry Petroski

… a 2-day course for developers of electronic products:

- What is wrong with conventional wisdom on reliability engineering?
- What is the real meaning of Mean Time Between Failure?
- Why is it possible to perform a reliability prediction, but impossible to predict reliability?
- What analysis can be used to evaluate the robustness of an electronic design?
- What should be done to ensure mechanical reliability of electronic equipment?
- Why is reliability demonstration testing fundamentally inadequate during development?
- Why should prototypes be tested beyond specification limits (as in HALT)?
- Why should reliability not be the responsibility of logistics or maintenance?
- What can be learned from the latest reliability engineering standards?

The objective of this course is to provide electronic design engineers with practical knowledge on how to prevent or at least reduce the occurrence of failures in electronic products. The course combines conventional wisdom with a modern approach to reliability engineering, indicating that many "industry standard" practices are incorrect and misleading. It argues that the focus of reliability engineering should be on value adding "engineering" activities, and not on "accounting" activities. Reliability can be defined as the "absence of failures". The emphasis of reliability engineering should therefore be on "failure prevention" during development and production, and not on "failure correction" during operations. Mathematics and statistics play a minor role in the course, with emphasis placed on tools and techniques applicable during the development phase of electronic products. Practical examples are used to illustrate "how" to perform individual reliability tasks.

Course contents

- What is reliability engineering?
- The real meaning of MTBF
- Why do products fail?
- Reliability programmes
- Systems reliability and modelling
- Can you really predict reliability?
- Failure mode and effects analysis
- Fault tree analysis
- Worst case circuit analysis
- Component derating analysis
- Mechanical failure of electronics
- Reliability testing and HALT
- Failure data analysis
- Examples of good practices
- Management of reliability
- References

Course presenter

Albertyn Barnard received the degrees B Eng (Electronics) *cum laude*, B Eng Hons (Electronics), M Eng (Electronics) and M Eng (Engineering Management) from the University of Pretoria. He has provided consulting services to defence, aerospace, nuclear, industrial and commercial companies since 1982. Lambda Consulting specialises in reliability engineering applicable to the design and development phase of products. Special interest areas include reliability analysis of electronic designs, and Highly Accelerated Life Testing. Albertyn has presented numerous papers on reliability engineering at national and international symposia. He won the Ad Sparrius Best Paper Award at the 2nd INCOSE SA conference in 2004, and the Gold Award at the International Applied Reliability Symposium (Europe) in 2009. He is a part-time lecturer at the Graduate School of Technology Management at the University of Pretoria.

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