

INTRODUCTION

1.1 AIM OF DESIGN FOR QUALITY

The overall aim of the Design for Quality program is to explore advanced quantitative methodologies for the design of mass-produced products in an environment where time-to-market and quality are critical.

1.2 FOCUS

The focus of this course will be on the advanced design methodologies of Design for Quality. Design for Quality, as it is just starting to be practised world wide, comprises a collection of analytical and experimental techniques for determining and optimizing reliabilities and making design decisions which will result in a product or process which is insensitive to tolerances and other 'noise' influences.

The methodologies are:

- Probabilistic Design: How to design with parameters which have tolerances rather than just fixed values, so that the reliability of the final product coming off the end of the production line can be calculated before the design goes into production.
- Robust design: How to optimize a design to maximize its reliability, so that production may proceed using the cheapest materials and processes, without compromising the quality of the design.

- Simulation: How to model the quality of thousands of units of a design coming off the production line and check that they are within specification before they are produced. How to simulate the wear processes in a machine and find out at which stage you may expect it no longer to function satisfactorily.

1.3 REFERENCES

1. Ang, Alfredo H-S. and Tang, Wilson H.
Probability Concepts in Engineering Planning and Design (I, II)
Wiley, 1975
2. Dieter, George E.
Engineering Design
McGraw-Hill (Second Edition), 1991
3. Harry, Mikel J. and Reigle, Stewart
Six Sigma Mechanical Design Tolerancing
Motorola Inc., 1988
4. Haugen, Edward B
Probabilistic approaches to Design
Wiley, 1978
5. Haugen, Edward B
Probabilistic Mechanical Design
Wiley, 1980
6. Shooman, M. L.
Probabilistic Reliability - An Engineering Approach
McGraw-Hill, 1968
7. Palisade Corporation
@Risk
Simulation add-in for Excel (Windows and Mac OS)