Tolerance Design

Tolerance techniques have evolved over the years through an ever-increasing quest for quality and efficiency. Tolerances are critical to the successful manufacture and performance of a product over its intended life cycle. The engineer's challenge today is not only to match the appropriate tolerances with the manufacturing processes but also to integrate the design and manufacturing functions to promote cost effective production.

This presentation stresses the importance of choosing appropriate tolerances in the design stage. Excessively tight tolerances can significantly increase cost; whereas, insufficient or loose tolerances can degrade performance and quality. Tolerances should derive from the customer’s requirements, the engineer’s knowledge and the analysis of the functional capabilities and limitations of the respective designs and their requisite manufacturing processes.

There are many different approaches that are utilized in industry for tolerance analysis. The more tradition methods discussed in this presentation include:

- Worst-Case analysis
- Root Sum of Squares
- Taguchi tolerance method