Optimization - Structures

Structures Applications
Summary

ANSYS provides a systematic approach to helping engineers to evaluate multiple product design ideas across a range of conditions and design parameters within a single environment, leading to enhanced product performance and integrity.

Design Impact

- Enhance product performance faster
- Ensure product integrity
- Increase development speed
- Reduce warranty costs


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**Application Example**

- **Objective: Ensure Product Integrity**
  - Ensure that high quality standards are met and reduce the number of prototype testing iterations.

- **ANSYS Solution**
  - ANSYS DesignXplorer enables Xerox engineers to perform numerous design of experiments (DOEs) to study the sensitivity of changes in key product variables such as part manufacturing tolerances, operating temperatures of the machines or differences in print media.

- **Value of Simulation**
  - ANSYS has enabled Xerox engineers to quickly simulate many printer components, and to earlier filter out marginal designs in the design process. Over-designed components can be cost reduced and amount of product testing can be reduced as well.
Application Example

**Objective: Increase Development Speed**
- Develop best performing graphite electrodes faster. Real-world testing extremely cost intensive, because of high temperature range of more than 3,000° and long process time.

**ANSYS Solution**
- In thermo-mechanically coupled analyses, the thermal stresses are calculated in the electrode and used for optimum utilization.
- Parameter identification by virtual DOE helps to reduce the number of real-world tests.
- Simultaneous computation reduces the overall time to get the needed answers from multiple weeks to less than one week.

**Value of Simulation**
- The new parametric licensing provides SGL Group a competitive advantage: they can meet customer requirements faster and more cost effectively.
Application Example

• Objective: Enhance Product Performance
  – Reduce imbalance of cutting tools

• ANSYS Solution
  – Generate each structural model automatically using CAD and parametric capabilities of ANSYS Workbench
  – Systematic design improvement by virtual DOE instead of manual trial-and-error approach, ensuring competitive advantage

• Value of Simulation
  – Through DOE and optimization capabilities, this company –
  – With slightly over 100 employees – has now adopted parametric, structural mechanical simulation to improve the performance of their cutting tools.

Source: http://www.webtechengg.com/
Application Example

• Objective: Reduce Warranty Costs
  – Develop and deliver quieter brakes by evaluating numerous brake designs prior to building expensive and long-leadtime prototypes. Brake noise is one of the top warranty issues that car OEMs and suppliers face.

• ANSYS Solution
  – A parametric, persistent simulation data flow provides fast and accurate brake squeal solutions for multiple design configurations.
  – Consider uncertainties as brake friction and pressure, material properties of brake pad, and manufacturing tolerances.

• Value of Simulation
  – The ability to automatically simulate many design points to quickly iterate to a brake design that meets noise requirements while delivering the best combination of performance, cost, weight, size and other factors.
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**ANSYS Advantages**

- Automated, parametric, persistent Workbench simulation workflow – scripting not required
- Fully integrated design exploration and optimization capabilities with ANSYS DesignXplorer
  - Easy to use
  - Wide variety of advanced technologies (correlation, DOE, Response Surface, Optimization, Six Sigma analysis, etc.)
- Cost effective, scalable licensing for simultaneous parametric design studies