Case Study

ANSYS® + Whirlpool Corporation

Automating the simulation process delivers high-performing, cost-efficient and robust products at the right price and within the design cycle timeframe. Using ANSYS Mechanical APDL with ANSYS ACT utilizes the power of the ANSYS Workbench with traditional APDL. This customization allows the Whirlpool team to employ simulation to shorten design time, standardize processes and provide consistent and reliable results regardless of the analyst's skill set.

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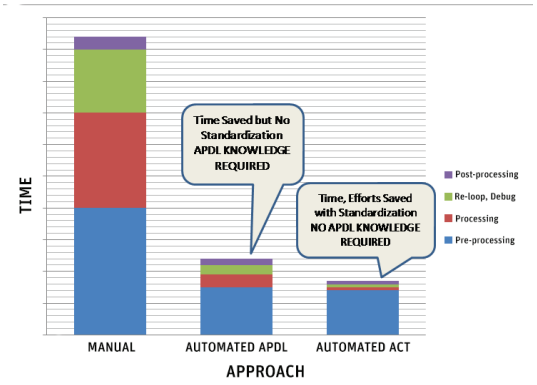
ANSYS Application Customization Toolkit (ACT) automates and standardizes simulation at Whirlpool.



Benefits of ANSYS Application Customerization Toolkit extensions

Consumers require high-performing products at the right price. For Whirlpool to achieve a cost-effective and robust design, engineers need to optimize the design by considering all appliance attributes — and within the product design cycle timeframe. To optimize products in a timely manner, Whirlpool turned to an automated process incorporating ANSYS software that provides consistent and error-free simulation results, and an easy-to-execute process.

Technology Used

ANSYS Application Customization Toolkit (ACT), ANSYS® Mechanical™ APDL, ANSYS Workbench™

Business Challenges

Whirlpool Corporation has used ANSYS Mechanical Parametric Design Language (APDL) for many years to automate most structural and thermal simulations. However, users saved multiple copies of APDL files which made it difficult to track and modify changes. In addition, Whirlpool spent time and exerted effort in training non-APDL users to properly apply the software. It was essential to automate, ease and standardize the simulation process so Whirlpool turned to ANSYS Application Customization Toolkit (ACT) extensions.

Engineering Solution

- Develop ACT extensions for thermal and structural simulations to leverage legacy APDL and automate the simulation process for non-expert users.
  - o Customize the user interface of Mechanical Workbench to Whirlpool's practices to easily set up and display relevant information.
  - o With the click of a button populate hundreds of standard named selections to solve simulation load cases. Selections will provide persis tence of the model for robust parametric analyses.
  - o A help button prompts users for simulation details including product state, simulation standard type and more. This helps reduce the level of training required to perform simulations.
- Perform parametric analyses to understand the product variability and find the best configuration for a given design.

Benefits

- Reduced simulation time by 60 percent when compared to the manual process.
- ANSYS design exploration with ANSYS Workbench with parametric model connectivity provided extensive optimization and performed DOE simulations to generate limits, trade curves and response surfaces for the product attributes.
- Easy execution of DOE studies using the ACT extensions within Workbench.
- Achieved consistent and reliable results due to automation and simulation specification control implemented through ACT extensions.
- Reduced new user start-up time and dependency on expert APDL users.

Company Description

Whirlpool Corporation is the world's leading global manufacturer and marketer of major home appliances, with annual sales of approximately $19 billion in 2013, 69,000 employees, and 59 manufacturing and technology research centers around the world. The company markets Whirlpool, Maytag, KitchenAid, Jenn-Air, Amana, Brastemp, Consul, Bauknecht and other major brand names. Whirlpool earns the trust of consumers in nearly every country by focusing on what matters most. The company uses simulation tools extensively to predict structural, impact, transportation, thermal, airflow, sound, mold filling, energy performance and more.
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