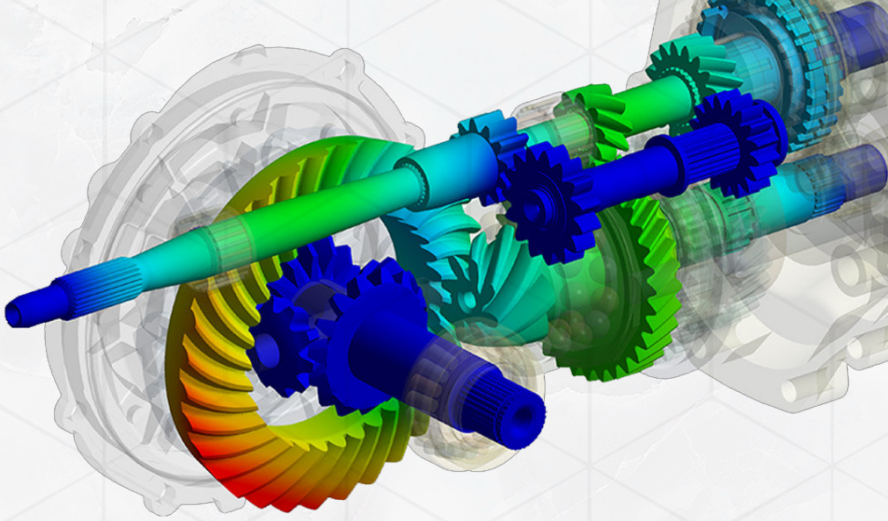

CASE STUDY

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CASE STUDY

ANSYS MULTIPHYSICS SOLUTIONS FOR MICROWAVE DRYER "HFSS – FLUENT COUPLING"

CHALLENGES

Revolutionize metal casting by optimizing sand core drying with microwave technology. Aim to create a multi-physics coupling workflow for uniform drying, faster processing, and efficient energy usage.
This system should adapt to various core compositions and integrate smoothly into existing casting processes. Achieving this will significantly improve the efficiency and sustainability of metal casting operations.

ENGINEERING SOLUTION

Utilizing ANSYS HFSS and Fluent Multiphysics simulation, the solution optimizes sand core drying for metal casting with microwave technology.

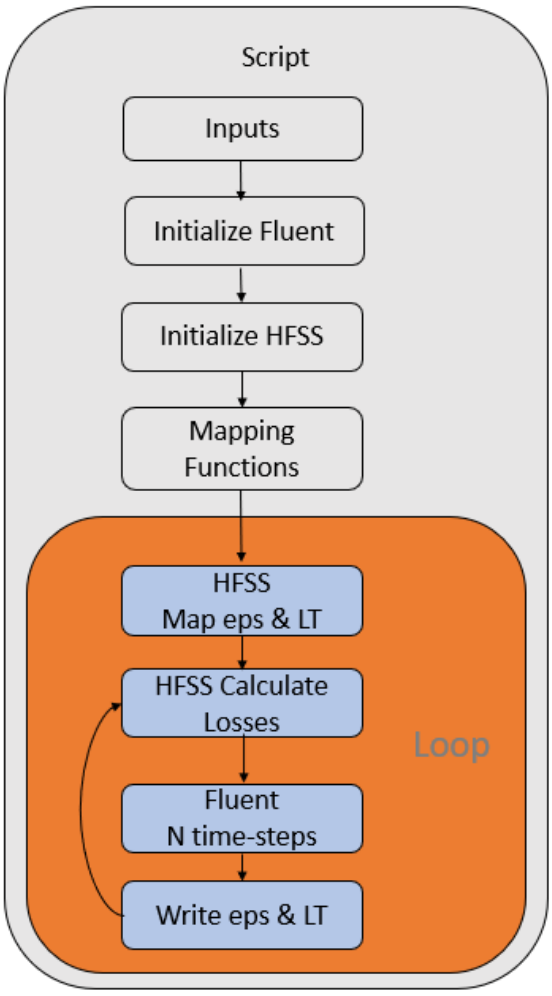

Figure 1. *Workflow flow chart*

A customized python script-based approach combines HFSS's electromagnetic modeling with Fluent's fluid dynamics and heat transfer simulations, allowing for a comprehensive understanding of the drying process. This enables precise sensitivity analysis over power inputs & temperature distribution, ensures uniform drying, and optimizes energy efficiency.

This Ansys Fluent and HFSS integrated solution caters to a wide range of industries, including Metal Casting, Automotive, Aerospace, Construction, and Electronics.

Figure 2. *Industrial Microwave Dryer for Metal Casting*

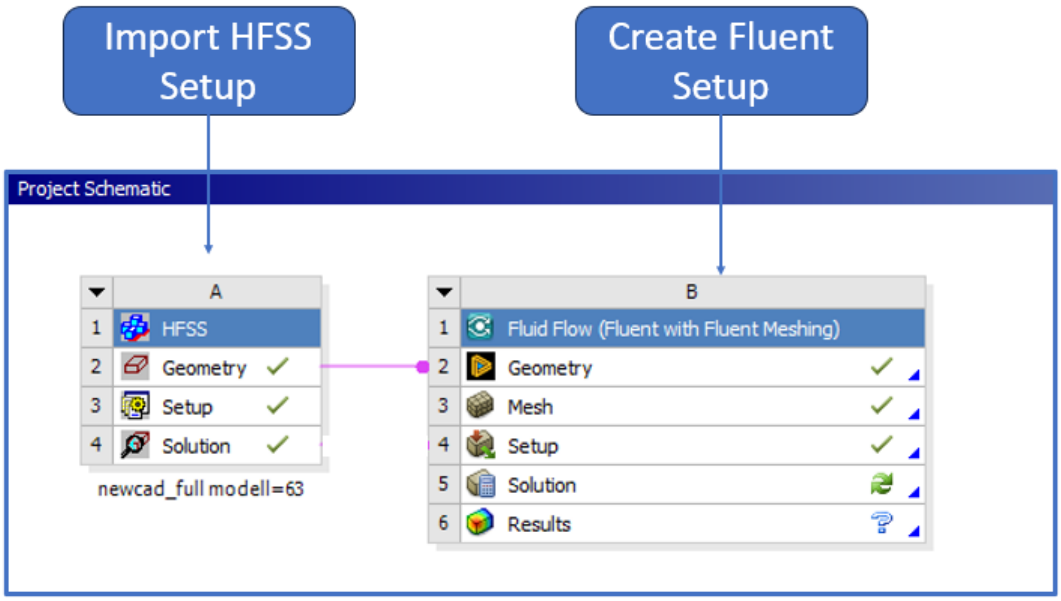

Figure 3. *Workbench HFSS - Fluent Coupling*

- EM losses mapped and interpolated on CFD mesh
- Permittivity and loss tangent dataset generated as function of water volume fraction using script
- Approximately 4X faster approach compared to direct coupling

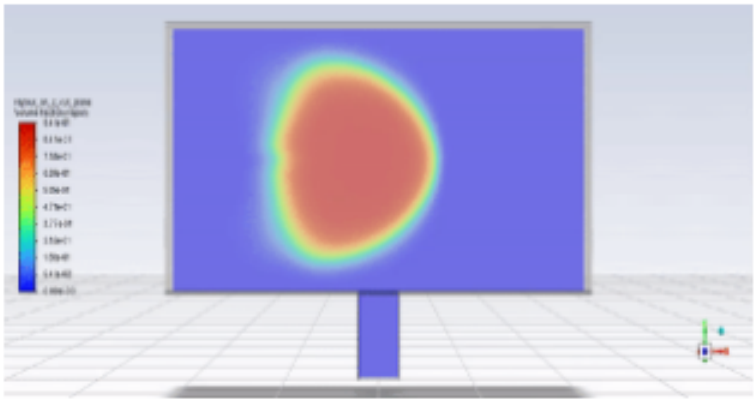

Figure 4. *Vapor Volume Fraction*

TESTIMONIAL

"A also wanted to highlight how interesting and productive the course has been.
We've gained some very interesting and useful skills, and we are excited to put it into practice. Thank you to all the team for your support and for offering such a valuable course."

Manuel Gonzalez, Electronics. Dep. Manager, Centro Stirling