Secure and improve your parts and structures

Design Department:
Structural simulation
Manufacturing process modelling

Thermomechanical modelling of a furnace crown with bricks and joints

Understanding and checking the behaviour of a structure while it operates, decrypting the part behaviour during its manufacturing process are keys for anticipating and improving the thermal, chemical and mechanical performances.

Aurock keep in touch with research centers and cultivates a strong experience of the ceramics and metals to provide engineering answers tailored to your needs:

- Quick solution overview under multiphysics phenomena
- Analyse the impacts of operating and processing conditions
- Aid to design and shape optimisation
- Effect of material properties for smart choices

Know-how

Numerical analysis

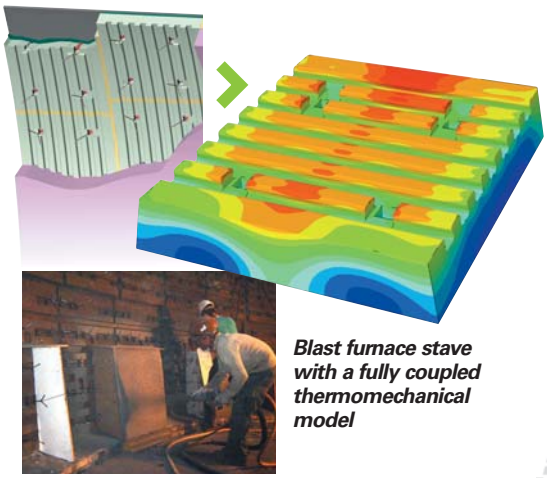
- Static and transient analysis
- Implicit & explicit schemes
- Design of Experiment (DOE)
- Optimisation techniques

Softwares

- Design: Catia V5®
- FEM: Abaqus®, Code Aster®
- DOE and optimisation: Isight®
- Internal solutions

Fields

- Bricks and tiles
- Stoneware
- Tiles and sanitary ceramics
- Metallurgical industry
- Glass industry
- Industrial Furnaces
- Refractory Ceramics
- Technical ceramics
- Semi-conductors industry
- Aerospace/Automotive
- Biomedical Ceramics



Blast furnace stave with a fully coupled thermomechanical model

Material Characterization and Modelling

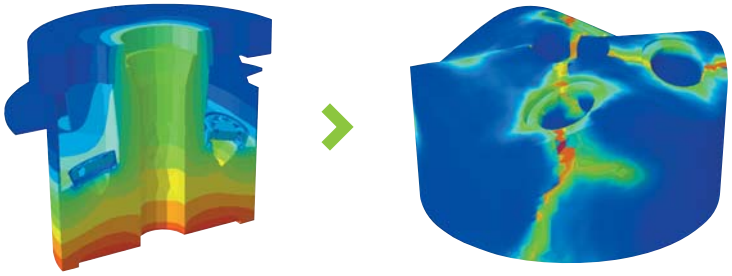
- Ceramic experts and metallic experts
- Characterization of various properties
- Resonant frequency & damping analysis
- Mechanical tests
- Elasticity, viscoplasticity, thermal dependencies...
- Multiphysics modelling for solids:
  > Mechanics, Heat transfert, Mass transport
- Identification of material constitutive laws
- Use and development of new scientific methods
- Engineering approaches for industrial structures

Plate firing support with asymmetric creep model under high temperature

Shape optimisation of the support to increase durability

Special skills for:

- Anticipation of mechanical damages
- Probabilistic effect on brittle materials
- Cracks, Contact, Joints modelling
- Creep/viscoplastic strain
- Thermal expansion and thermal shock resistance
- Chemically-induced stresses
- Electrochemical diffusion
- Powder compaction



Sizing of Refractory Castable Gas-Burner Using Thermomechanical Simulations (Optimise SARL)

Services

- Thermal, chemical & mechanical simulation for manufacturing process and structural analysis
- Aid to design & definition of process parameters
- Optimisation of mechanical performances according to technical & economical criteria
- Sensitivity analysis of parameters
- Stresses, strains, displacements, reaction force, pressures, thermal distribution, thermal flux, thermal stresses, damage mapping...
- Technical & scientific support on manufacturing processes
- Academic R&D solutions transferred to industry
- Innovative solutions

AUROCK

Think differently !

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