framatome

Computational Fluid Dynamics

Safe and Competitive Design Based on Reliable Numerical Simulation

Computational fluid dynamics (CFD) enables the visualization and optimization of complex flows at early project phases leading to cost savings and in-time engineering solutions.

Challenge

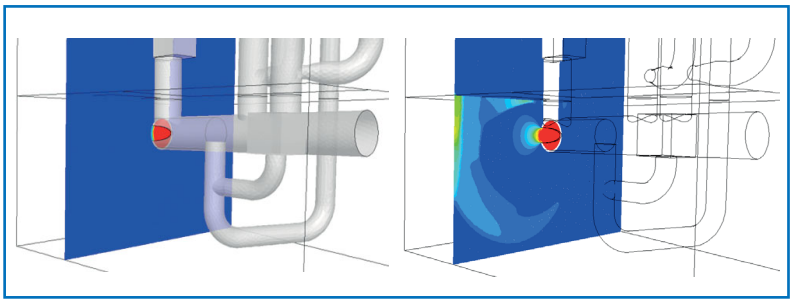
Most process engineering applications include complex phenomena such as turbulence, multi-phase flow, chemical reactions and fluid-structure interactions. Obtaining information on fluid flow during the engineering process by measurement or experiment is expensive if not impossible.

Solution

Framatome has a high level of competence using commercial CFD codes. Our state-of-the-art expertise is the result of long-term experience and successful partnerships with diverse industrial organizations and research institutes: power generation (nuclear, fossil fuels, renewables and wind), chemical industry, turbines and rotating machinery, etc.

CFD analysis in the area of flow mechanics will support you in:

- Improving and verifying design and performance of industrial components
- Performing parameter studies for design optimization, lifetime extension and cost reduction in hardware
- Understanding key hydrodynamic parameters
- Accomplishing root cause analysis
- Enhancing realistic load determination
- Verifying safety regulatory compliance
- Exploring innovative solutions by supporting design of experiments.



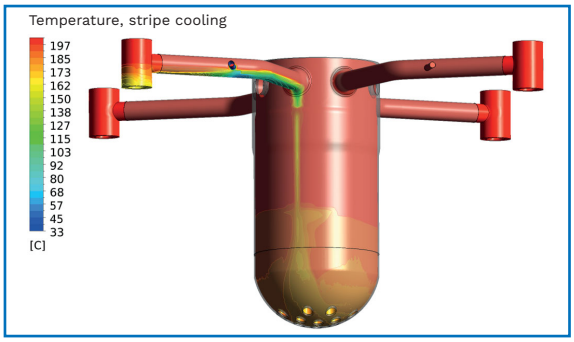
Blast effects with CFD

Your performance
is **our** everyday **commitment**

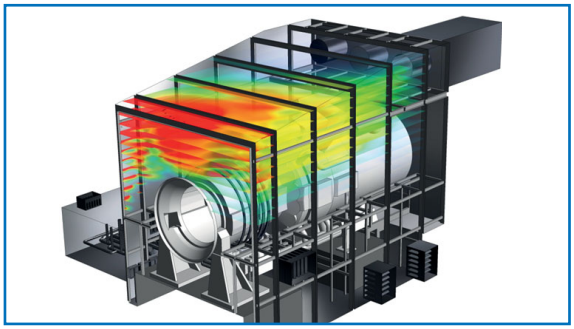
Customer benefits

Enhanced understanding, optimization and improvement of multi-phase flows and complex processes:

- Access to detailed information about three-dimensional time-dependent flow variables
- Possibility to accomplish several “virtual experiments” in high-fidelity models “what if...”
- Shorter product development time and performance improvements
- Reduction of conservatisms by realistic load determination
- Reduction of costs during the optimization process



Pressurized thermal shock and thermal fatigue



Distribution of fuel gas in a gas turbine enclosure

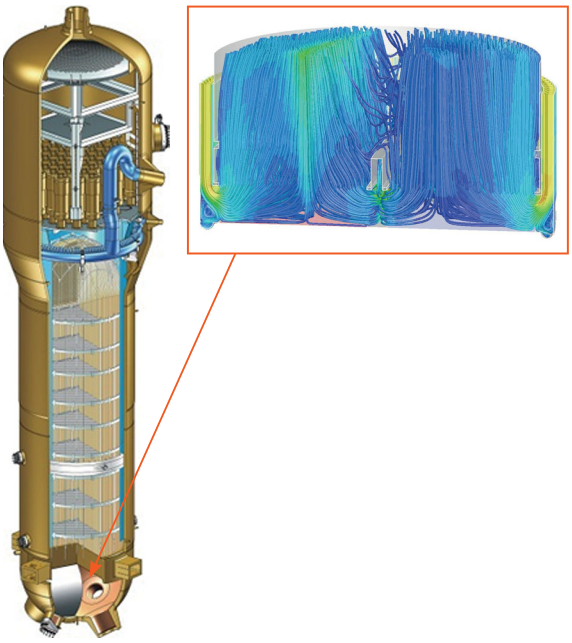
Technical information

We offer expertise in the numerical simulation of a wide range of physical phenomena such as:

- Fluid-structure interaction
- Flow-induced vibration
- High-turbulence flow
- Multi-phase flow, including particle flow and continuous phases
- Multi-species flow, including chemical reactions
- Thermal loads
- Turbomachinery
- Combustion.

We are experienced with the application of a wide range of state-of-the-art CFD codes with the advantage of a dedicated code-validation process based on experimental data. Our expertise ensures proper simulation of the project-relevant physical phenomena and facilitates regulatory acceptance of the analyses results.

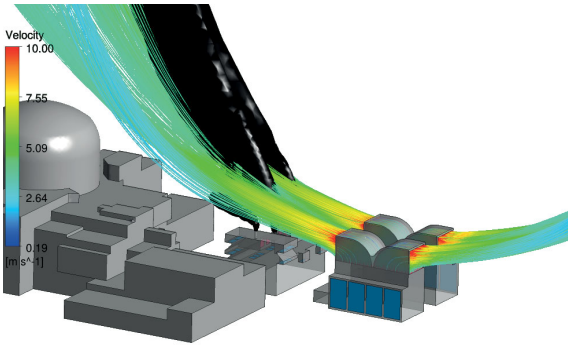
As a customer you also benefit from a close cooperation between Framatome's CFD, thermal-hydraulics and structural experts. The in-house analysis chain combines system-code analyses with CFD and structural analyses to evaluate thermal and mechanical stresses for a broad spectrum of scenarios.



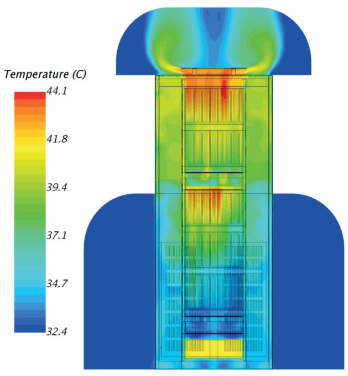
Heat exchanger fouling and particle deposition

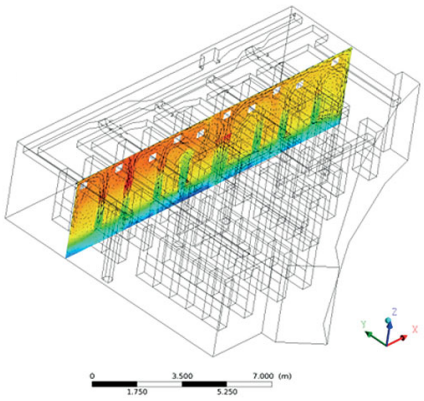
References

We have worldwide and long-term experience in the nuclear sector and successful partnerships with diverse industrial organizations, research institutes and universities.

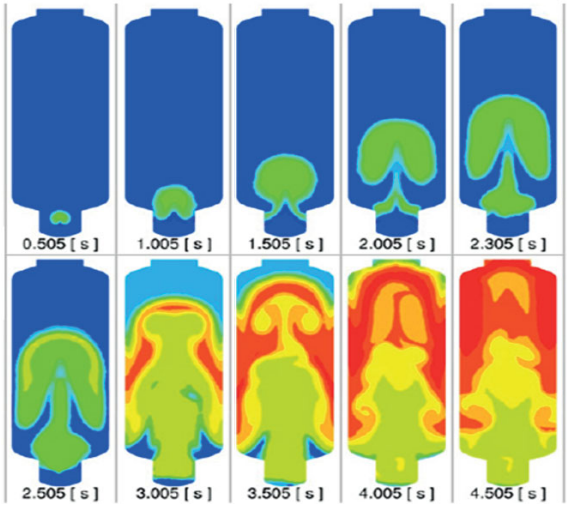


Near-field atmospheric dispersion





Thermal analyses of instrumentation and control rooms and cabinets



Hydrogen combustion and flame propagation

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